V1 A CYCLOPEDIA OF EDUCATION

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A
CYCLOPEDIA OF EDUCATION

EDITED BY

PAUL MONROE, Ph.D.

PROFESSOR OF THE HISTORY OF EDUCATION, TEACHERS COLLEGE
COLUMBIA UNIVERSITY

WITH THE ASSISTANCE OF DEPARTMENTAL EDITORS
AND
MORE THAN ONE THOUSAND INDIVIDUAL CONTRIBUTORS

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PREFACE

A Cyclopedia of Education: The present work is the result of the coöperative effort of several hundred specialists, who have here contributed the results of their study to the systematizing of educational ideas and practices. A spirit of loyalty to their chosen profession and a scholarly interest in the attempt to give a more definite scientific basis to the work of the teacher have been the dominant motives. That no such cyclopedia has ever appeared in English, although similar ones have existed in other languages, is the justification for such an undertaking. The resulting work represents the product of long investigation on the part of most of the contributors, and is the immediate outcome of several years of special effort on the part of the editors.

The Need for such a Work: Three conditions indicate clearly the need of such a work for English-speaking people: First. The vast and varied character of educational literature, indicative of a corresponding variety in educational ideas and practices. Second. The growing importance of education as a social process, of the school as a social institution, and of the teacher as a social functionary. Third. The great numerical strength of the teaching profession and its rapidly changing personnel.

The last annual bibliography of education published by the United States Bureau of Education contained more than twelve hundred titles. The publishers' announcement of the past year gives the titles of 348 new works on education out of a total of 8745 new books issued in the United States. For several years previously the ratio was even larger. In England, the ratio was 578 to 8446; in Germany, for the preceding year, the ratio was 4203 to 30,317; in France, 1005 to 8805. This summary does not include the very numerous volumes, classified under history, philosophy, sociology, religion, and related subjects, which have immediate educational significance. During the same time educational periodicals were issued in the United States to the number of 150; in Germany the number is even in excess of this total. This vast and growing literature indicates not only a vigorous interest in educational problems and practices, but it is evidence also of an equally great diversity in views and in practices. It is clearly evident that the rank and file of the teaching profession, as well as the casual social observer, would be hopelessly lost in this maze of material, and that some guidance is necessary even to those most thoroughly prepared to seek for the sanest ideas and the soundest practice. But no attempt has previously been made in English to systematize the extensive body of knowledge found in this rapidly expanding literature.

The need for such a work is further emphasized by the growing importance of the teaching profession. It is now the largest in point of numbers of all the professions. Its standards, while vague, are gradually being raised and harmonized, its aims broadened and made more definite. In fact, one of the most significant of recent social changes is the tendency to throw upon the school various social and ethical responsibilities hitherto assumed by other professions or by other institutions. The school is, in the broadest way, being made responsible for the morals of the growing generation. The family no longer performs its earlier function of training in practical activities and homely duties; and the school must take its place. The playground, with its development of sound physique, of skill, of the sense of fair dealing, of interest in group activities, must be incorporated in the school. Even the opportunities for social amusements, with the resulting attainment of social graces, are now coming to be offered, both in urban and rural communities, through the school. Devotion to private morality and to public duty are now expected to result from the work of the teacher rather than from that of the parent or other professional guides. The school is expected to lessen, if not to obviate, the work of the court, especially for juvenile offenders; to furnish the services of the physician and dentist; to serve in place of the minister; to surpass, both in scientific character and in practical value, the work of the farm, the shop, and the home. The overburdened teacher needs a guide in the maze of his new duties and multiplied activities; the public needs a source of information as to what the school is trying to do and is actually accomplishing, and why it is making such efforts.

Even these hints of the enlarged scope of the teacher's work do not fully present the situation. Society is laying all of these tremendous responsibilities on a profession for which it makes no adequate provision, either in the way of remuneration or by other inducements, to attract the best talent to the profession, to train such talent adequately, or to retain it for any length of time. The teaching profession is a rapidly changing one. Probably twenty-five per cent of the entire profession in the United States is renewed each year. It seems almost a travesty to call such an unstable body a profession; and a blunder for society to bestow such tremendous responsibilities, with so slight consideration of the conditions implied. The work of the educational administrator is to replenish the rapidly depleted ranks with the best material available; to raise the new recruits as quickly as possible to a standard of efficiency; to improve them constantly while in service.

The Scope of the Work: These volumes will include a concise discussion of all topics of importance and interest to the teacher, and will give such information concerning every division of educational practice as is essential to a book of reference. Completeness of treatment is not designed. Completeness of scope is attempted. Every aspect of education as an art and as a science will be treated. The main departments will be those of the Philosophy and Science of Education; History of Education; Educational Biography; Educational Institutions, including Universities, Colleges, and special Institutions; Secondary Education; Elementary Education; the Curriculum; Educational Administration and Supervision; School Systems, home and foreign; Educational Method, general and special; Educational Psychology; School Hygiene and School Architecture. Every subject taught in the school will be considered in detail, as to history, content, educational value, special methods, and bibliography. Every important method or educational device that is advocated now or has found a place in the past will be defined and evaluated. The department of Educational Administration will include a treatment of the system of education in every country and in every commonwealth in the United States. Each of these articles will include an historical treatment as well as an analysis of contemporary conditions. All institutions of higher education will also be considered individually; every phase of educational work in the various social ramifications of the present will be presented. Every important point in school administration, school supervision, and classroom management will be treated by some specialist competent to deal with the subject.

Slight attention has been given to matters of opinion only. The aim is to present authentic information. With current problems the purpose has been to state the facts of the problem only, leaving inferences to the reader after consideration of the facts presented or after reference to further discussions.

The Aim of the Work: The making of a work of reference is only one, and that not the most important, of the motives which have controlled the editors. In the first place it is hoped that by standardizing and organizing in a succinct form the information essential for an intelligent participation in educational activities, something will be contributed to the solution of educational problems; if in no other way, at least through its direct aid to those engaged in practical work.

As a work of reference the pragmatic purpose is evident. The need for a comprehensive organization of information concerning education has been indicated. Not only does the teacher need a source of information for all problems which come up in the schoolroom and for all discussions of theory that grow out of these, but school administrators and local officials require an accessible source of information that will give them the main points in regard to any topic and put them immediately in touch with the best literature relating to any topic. Professional men, editors, ministers, politicians, — whoever deals with questions of public welfare intimately connected with education, — need a reference work giving the outlines of educational problems, the suggested solutions, the statistical information, and, in general, the essential facts. Much of this information cannot now be obtained from existing books of reference. Such assistance this Cyclopedia seeks to give.

The most practical and most immediate aim is to be of service to the rank and file of the teaching profession. To accomplish this end, the entire work is organized not simply as a book of reference, but also as a systematic treatise on each phase of the subject. To further this design, each aspect of the subject which lends itself to systematic scientific treatment is under the charge of a departmental or associate editor who is an authority in the special field, and who is responsible, not only for an adequate presentation of established facts, but for such a systematic organization of the material that the combined articles will serve as a scientific treatise on the subject. To this end the work includes a logical outline of the topics treated, with paginal references. With such analyses the work will constitute an authoritative and comprehensive yet condensed textbook on method, on educational psychology, on school administration, on school hygiene, on the history of philosophy of education, etc.

Finally a deeper professional motive has actuated those who have contributed most to the work. Out of such an organization of materials, so heterogeneous in character, it is hoped that some greater unity may be given to our educational thought and a greater uniformity may result in educational practice. The mere systematization of educational ideas, with a greater degree of uniformity in use of terminology, should assist in unifying educational thought. The bringing to light of divergent practices; the statement of the results of the best conducted experiments; the statement of theory underlying our practice; the effort involved in the application of the comparative method of investigation and study, — all these should tend to a uniformly higher plane of educational practice.

The Editorial Staff: The first volume includes about a thousand title entries. The articles are the contributions of more than one hundred specialists. Subsequent volumes are now being prepared by contributors representing an equally wide range of interest. The departmental editors, chosen chiefly from the American field, represent in every case the most authoritative and sane specialization in their respective spheres. To a number of contributors the editor is no less indebted than to the departmental editors.

The completed work will be the consummation of plans, developed through many years; the execution of these plans will be due to the coöperation of the numerous contributors, whose assistance has been as generous and hearty as their scholarship is wide and thorough.

THE EDITOR.

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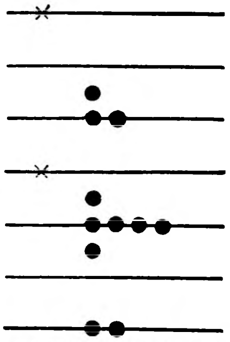
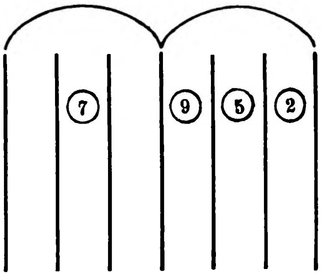
A CYCLOPEDIA OF EDUCATION

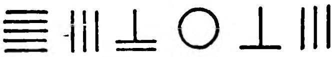
ABACUS. — A term used in education with several meanings. As a school instrument it seems originally to have meant a sand table, or board covered with fine dust, whence the Greek ἄβαξ from the Semitic abq, dust, — the most commonly accepted of several etymologies. Upon this dust-covered table figures were written, to be erased by rubbing with the thumb. This form of abacus seems to have been of Semitic origin, and its use extended to the Far East and to Europe, the name *tabula geometricalis* being often applied to it in the Middle Ages. Upon this abacus the calculator or geometrician wrote with a *stilus* or *radius geometricalis*, very much as on the wax tablet of the Greeks and Romans, which was itself a variant of the sand board. Numerals taught in the western Arab schools by the help of this dust board were commonly known as *gobâr* (dust) numerals, and these are closely related to our modern "Arabic" forms. The second and more distinctive form of abacus was a ruled table upon which sticks or disks were placed in such a way as to represent numbers. The earliest forms of counters were probably pebbles (*calculi*, whence our word "calculate"). These were thrown upon the ruled table, and hence were called *projectiles* or *jetons* (from *jacere*, to throw), and hence our expression "to cast an account." They were also known as *abaculi* (counters or reckoning pennies), in Latin *denarii supputarii*, and in German *Rechenpfennige*, *Zahlpfennige* or *Raitpfennige*.

There have been four leading variants of this kind of abacus. In the first the counters were loose disks placed in lines or spaces to indicate numbers, a form that continued in Europe until the eighteenth century, although not usually described in textbooks after the latter half of the sixteenth century. Shakespeare speaks contemptuously of a shopkeeper as a "counter caster," and Hartwell in his 1646 edition of Recorde's *Ground of Artes*, speaks of ignorant people as "any that can but cast with counters." Such an abacus is here illustrated. The lines indicate, from the bottom, units, tens, hundreds, and so on, a cross being placed on the lines of thousands and millions, and on every third line thereafter, this being the origin of our separatrix. The spaces represent 5, 50, 500, and in general $5 \cdot 10^n$, a relic of the Roman notation which was originally used in central Europe in connection with this form. Thus in the above figure the number represented is 70,952. It is evident that the simple operations can be performed by manipulating these counters, and so common was this method that "to abacus" was a recognized verb of the Middle Ages, and arithmeticians were known as *abacisti*. A second variant is the " arc abacus," "column abacus," or "arcus Pythagoreus," commonly attributed to Gerbert (Pope Sylvester II, *c.* 1000 A.D.). In this form, which was never extensively used, the lines were vertical and the threefold groups (our "periods") were marked off by arcs. Instead of using several counters to represent any number of units, Gerbert used one upon which the number was written, the zero having no counter, as in the above representation of 70,952. As soon as the zero became well understood, this form of the abacus lost what little standing it had. A third form of the counter abacus is the one in which the calculi are either strung on wires or allowed to slide in grooves. This form was used by the Romans, at least five early specimens having been known in recent times. The Roman abacus resembled somewhat the late Japanese *soroban*, which is still used for practical computation. The Japanese derived this instrument from the Chinese in the seventeenth century, modifying it slightly, and the Chinese seem not to have used their *swan pan* before about the thirteenth century. The old mathematical treatises of China represent numbers by rods Fig. 3, representing 537,063. This is the fourth form of this class of abacus. In Japan, at least from about 600 A.D., bamboo rods (*chikusaku*) were used, these being later replaced by the *sanchu* or *sangi*, rectangular sticks laid in squares on a ruled table. By the *sangi* the number (Fig. 4), 527,068, would be represented as here shown. In Persia the beads are strung on wires, and this form is also found

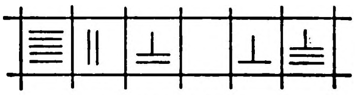

The abacus ruled on a table.



The arc abacus.


Chinese abacus.

among the Arab traders to-day, and evidently worked its way north into Russia, where it is still almost universal. With the abacus reckoning is closely connected the early Court of the Exchequer, the tally stick, the *quipos* of Peru, the use of counters in games (like poker chips and the bead counters used in billiards), the conversation beads of the Mohammedan, and the prayer beads of certain religions (such as the rosary). Even to-day a great part of the world does its computing on some form of the abacus, and for the more enlightened part there is a return to mechanical calculation by means of the modern computing machines.



Japanese abacus.

The term "abacus" came also to be used in the Middle Ages to mean merely arithmetic, as in Leonardo Fibonacci's *Liber abbaci* (*sic*) of 1202, and in numerous other *abaculi*. Even as late as the time of the early printed arithmetics, *Libro d'abaco* was not an uncommon name for a textbook on the subject.

In modern education there has been a return to the use of counters or of similar devices in the teaching of number to young children, a commendable idea when not carried to an extreme.

D. E. S.

ABANDONED CHILDREN. — See Foundling Homes; Orphans, Education of.

ABBEY SCHOOLS. — The importance of abbeys and monks in the advancement of education has been much exaggerated. To these alone has been imputed the preservation of learning in the Dark Ages, which research has been pushing further and further back till they almost disappear in the light of the Roman Empire, so much less dark are they found to be than they were painted. Indeed it may almost be said that their darkness varies directly with the darkness and the ignorance of those who dub them dark. The abbeys at first undoubtedly set themselves against learning. Even Hieronymus, commonly called St. Jerome, reputed the most learned man of his age, with learning acquired in the public schools of the "heathen," in theory tried to put learning behind him as an evil thing, when he became a monk, and a legend tells how an angel came and flogged him for reading Cicero. He repudiated the bishops and priests who sent their sons to secular schools and to read Vergil. It has been accepted and repeatedly said that there were schools in the abbey of Lérins founded by St. Honorat *c.* 410, but it is mere assertion without one single document adduced in its support. There were learned men among its members, no doubt, but they had got their learning before going there. That bishops resorted to it as a retreat is true, but not for learning any more than the schoolmasters who went into retreat at Radley a few years ago went there for the good of their minds. They went for the good of their souls. Even Mabillon, who has done more than any one to color the history of abbeys with a learned tinge, points out this error. The institutions of Cassian (*q.v.*), who founded the abbey of St. Victor at Marseilles *c.* 417, have been cited as tending to encourage learning. But he attacked it. He declares the syllogisms of dialectic and the eloquence of Cicero are unworthy of the faith. A monk is directed to drive out all remembrance of secular learning by incessant reading of the Scriptures. Even learning in theology is discouraged. A monk is not to study commentaries. "If he gives himself to chastity, the understanding of the Scriptures will come without any theological studies." He forbids even the art of writing. More than a century later Cassiodorus (*q.v.*), one of the most learned men of his age, founded two abbeys in Calabria and wrote his *Institutions* for them. He did enjoin the study of the Fathers and Christian historians as well as of the Scriptures; and he allows the study of grammar so that the Scriptures may be copied correctly. But it was not Cassiodorus, but Benedict, who became the prophet of the monks. The Benedictine Rule (see Benedictines), of almost the same date as the *Institutions*, set apart only two hours out of each day for reading, except in Lent; when, lack of food preventing hand labor, the monks were required to read through one book during that period, but the only books mentioned, or apparently allowed, were the Bible and the Psalters. Even this rule was remitted for those who were too lazy to read. They might commute it for work. Not a word in the rule refers to education. Boys were allowed to be offered (*oblati*) to God and presumably to be brought up in the monastery, and of course they must have been taught. But even this is not said, and no hint is given of education of outsiders being a duty to monks. It is only when we come to the Celtic monasteries of the sixth and seventh centuries that there is any identification of monasteries with education. There is no authentic evidence of this before St. Columban (*q.v.*), said to have been born about the middle of the sixth century and by a biographer rather more than a century later to have studied grammar, rhetoric, and geometry. The number both of monks and clerks seems to have been greatly exaggerated. Apparently whole families and clans formed monasteries. An obscure phrase in the Brehon laws, "purity benefits the church in receiving every son for instruction," is interpreted to mean that all were to be educated. What appears to be certain is that some were educated and that Irish monks conveyed learning to England, and English clerics and monks went to Ireland to learn. Clonfart, under St. Brendan, is credited with 40,000 monks, but no doubt through a misreading. Thrice fifty seems to be the normal number in the round figures of Hibernian and monastic exaggeration. English monasteries founded on the Celtic model, such as Jarrow and Wearmouth, contained six hundred monks, and Bede (*q.v.*) the master, as Alcuin (*q.v.*) calls him, was educated in the monastery and spent his life in educating others, and died about 735. It is to be observed that no word is said as to his educating other than the inmates of his monastery. Letters of Aldhelm's are preserved of doubtful authenticity, purporting to come from foreigners wishing to be taught by him at Malmesbury. But they seem to be monks. St. Columban carried the same influence to France. There is great exaggeration in the amount of learning and the number of the learned. The Lives of Saints repeat with unabashed plagiarism the very same phrases one after another as a sort of common form for the accounts of the successive youthful prodigies of learning which those who in after life developed into saints are all represented as being. Still at this epoch monasteries in Ireland, in England, and in France do seem to have become the centers of learning and schools. Alcuin, however, who illuminates the Palace Schools of Charlemagne from 780 onwards, was not a monk, though often spoken of as if he was. When he did enter the abbey of Tours as abbot in 796, it is difficult to make out how far he still kept an open school. He certainly repudiated his own love for Vergil and the classics. While under Alcuin's influence, Charlemagne attempted to make the monasteries into abbeys. The decree of the Council of Aachen or Aix-la-Chapelle in 789 for the establishment of schools where music, arithmetic, grammar, and writing should be taught had extended to monasteries as well as cathedrals. The famous plan of St. Gall in Switzerland attributed to the influence of Eginhard, Charlemagne's son-in-law, shows an outer school as well as an inner cloister (*q.v.*), a novice's school; a boarding school for gentle youths (*pulcra juventus*) with a master's house attached. But this plan was never carried out, and it is probable that none of the outer schools of monasteries were ever established. At all events, by another Council at Aachen under the reactionary Louis the Pious in 817 the ascetic view again prevailed, and outer schools were expressly prohibited. "No school shall be kept in a monastery, except for oblates." From this time there is no evidence of abbeys doing anything through their own members for the education of others. The monastic or cloister schools (*q.v.*) were solely for novices and oblates. In the eleventh and twelfth centuries, when the secular canons were turned out to make room for regulars, an attempt was made to transfer to the abbeys, more particularly to the new orders of Regular or Augustinian canons, not to the old order of Benedictines, the control of the schools. But the schools were transferred as property, like the churches and other possessions of the extruded canons, and were not intended to be, and were not, taught or governed internally by the abbeys. Thus at Bury St. Edmunds (*c.* 1020) King Canute turned out the seculars for monks, and we find the abbey afterwards governing the school. At Dunwich, the school, founded in 631, the first in England of which the foundation is recorded, was "with all the churches of Dunwich built or to be built" given over to the Priory of Eye on its foundation in 1083. Thetford school was granted to Thetford Cluniac Priory in 1107, but about 1114 recovered by the Bishop of Norwich and granted back to the Dean of Thetford. At Reading in 1125, Huntingdon in 1427, Dunstable in 1131, Gloucester in 1137, Christ Church, Hants, in 1147, Derby about 1150, Bedford about 1153, Bristol in 1171, documents recording the transfer to or the assertion of the rights of the abbey or priory in consequence of a transfer are preserved, chiefly in the chartularies of the intruding monks or canons. But the inmates of the abbey did not teach the schools themselves. They only appointed the masters, who were always seculars, and asserted, on occasion, the monopoly of the masters in their jurisdiction. They did not even as a rule pay the masters, who lived on tuition fees. In the fourteenth century, however, the monasteries began to do something for the education, not of outsiders, but at all events of those who were not prospective monks, in the almonry schools (*q.v.*), established for their pages and choristers the charity boys then first introduced into monastic churches, numbering from 12 or 13, at least in one place (St. Mary's Abbey, York), to 50 (the round number). Also the abbots used to receive young noblemen, especially, we may suppose, the sons of the abbey knights and other chief tenants, into their houses as wards and pages. Thus, Abbot John II of St. Albans, 1235–1260, is said to have been known among all the prelates of the realm as a mirror of religion and a wit, and very liberal, and so many nobles of the realm committed their sons to his guardianship to be brought up. But we find, as at Glastonbury shortly before the dissolution of abbeys, that they were very few in number and that a private tutor, a secular, was employed to teach them. In abbeys for women this process was more common. Not only did they take in young ladies, as in the celebrated return of them at St. Mary's Abbey, Winchester, at the dissolution, but they took in little boys as well, as we learn from many fulminations at visitations against their keeping boys too old, or at all, and in the dormitories. The amount of education given in them, however, was of the smallest, for though in Saxon times there is plenty of evidence of the high education of the nuns, in post-Conquest times, they were certainly not learned. One proof is that they were always addressed by the bishops in French as only being acquainted with what was then the vernacular, as in the celebrated letter of Archbishop Peckham to the nuns of Godstow about their too great familiarity with Oxford undergraduates. Nor indeed were the abbeys for men such houses of learning themselves as to be capable of becoming so for others. The abbey school taught the Benedictine rule rather than grammar. Episcopal visitations in all centuries ring with complaints of their want of learning. When Benedict XII in 1335 tried to make the Benedictines and Augustinians learned, he ordered them to provide a grammar master, who, contrary to the rule, might be a secular. The specimens of such appointments preserved are secular. One of the latest, at Winchester, was the Usher or Second Master of the college. Yet William of Wykeham had to complain of the monks of the cathedral of Winchester murdering the quantities in reading the lessons, and so did William Warham of the monks of Canterbury a century and a half later; while Bishop Nicke's visitations of Norwich at the end of the fifteenth century are full of complaints that no grammar schoolmaster is kept at the monasteries and that the monks are ignorant. The abbots and friars had generally been to Oxford or Cambridge under the statute of 1335, which required five per cent of the monks to go to the universities. Nothing like that proportion went, in fact. Even at Westminster Henry VII complained at the end of his reign that the monks were sunk in ignorance, and gave a new endowment to send three of them to the university. Popular literature from the twelfth century downward, notably the *Canterbury Tales*, testifies to the disregard for learning in the abbeys. The cause of education and schools suffered nothing by the dissolution of abbeys by Henry VIII, except in those cases where the schools and their endowments, for which they had been trustees, were treated as abbey property and confiscated to the Crown, without refoundation. A. F. L.

ABBOT, GORHAM DUMMER. — Schoolman born at New Brunswick, Me., Sept. 3, 1807; educated in private schools and at Bowdoin College and Andover Theological Seminary; teacher in the academy at Castine, Me., principal of the academy at Amherst, Mass.; instructor in the Mt. Vernon School for Girls; director of Society for the Diffusion of Useful Knowledge 1836–1843; principal of Spingler Institute, afterwards Abbot Collegiate Institution, 1843–1871; author of a spelling book, and, with Joshua Leavitt (*q.v.*), of a series of school readers; died Aug. 3, 1874. W. S. M.

ABBOTSHOLME. — A school opened in 1889 by Dr. Cecil Reddie, who was profoundly impressed by the limitations of the English Public Schools (*q.v.*) and undertook "to provide for boys, between the ages of about ten and nineteen, an all-round education of an entirely modern and rational character, based upon the principles of educational science, and adapted to the needs of the English cultured classes, which should direct the national life." It is this appeal to the needs of the directing class, together with the recognition that these needs include some phases of training usually left to the lower classes, that have been most frequently noted by critics. Early in the history of the school Dr. Reddie came under Herbartian influence, and reorganized his work, which had leaned toward natural science, by an arrangement of humanistic studies in stages, grouping what seemed to be appropriate material for each year of age around a core or center. Thus one year was predominantly given to French interests and materials, another to German, etc. The teachers trained by association with Dr. Reddie have been conspicuous in their later work for pedagogical technique.

Few schools have been kept so definitely at the focus of consciousness of a founder. A most elaborate and extensive set of records and photographs has been made and preserved. The book *Abbotsholme* contains an extraordinary amount of material showing the theories of the author, and accounts of what has been attempted. The building, located on an estate of one hundred and fifty acres in Derbyshire near Rocester, is a marvel of planning. The details of school life are minutely prescribed. It seemed significant of the extent to which English traditions of corporal punishment prevail that this was almost the only activity about which no records were made and the estimates of the number of cases by head boy and prefects (who are permitted to flog on agreement of all the prefects with the consent of the head master) differed considerably from those of the masters.

The grades of society below the prefects are stars (who perform special service), mids, and fags. There are two or three of these last assigned to each prefect. They are supposed to perform any duties assigned to them, and in turn the prefect is expected to look after his fags, take walks with them, etc.

The formal aspects of religious services receive considerable attention. The emphasis here upon form seems to be similar to that in all other fields in the school; the intention is that whatever can be systematized shall be put into machine operation in order to free the higher centers for work requiring originality and initiative. Dr. Geddes' and Dr. Scott's criticisms of this are suggestive (see bibliography). The earlier emphasis upon the activities of outdoor life, as haymaking, using these as an opportunity for participation in productive labor and for festival celebration, has been somewhat reduced. The garden has on the whole yielded somewhat to cricket, but the extensive records of the school experiments will well repay the study of those who are concerned with one of our most urgent problems, — the balance of cultural and vocational interests and activities during the adolescent period.

The school has attracted wide attention and has directly influenced schools in various countries more extensively than has perhaps any other single school since Fellenberg founded Hofwyl. For an account of this influence and a list of references see article on THE NEW SCHOOL. F. A. M.

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ABBOTT, BENJAMIN (1762–1849). — Schoolman educated in Phillips Academy at Exeter and at Harvard College; instructor in Phillips Academy at Exeter and first principal of Phillips Academy at Andover (1788–1838). W. S. M.

ABBOTT, JACOB (1803–1879). — Author of the "Rollo books"; educated in the district schools and at Bowdoin College and Andover Theological Seminary; professor in Amherst College (1824–1829), principal of Mt. Vernon School for Girls in Boston (1829–1834); edited several school books and wrote more than 200 books for children. W. S. M.

A-B-C METHOD. — A method of teaching reading to beginners, in which the first step is to learn the names and letters of the alphabet in order. The letters are then combined into syllables and words, which are pronounced through the assistance given by spelling. It is the method of teaching "reading by spelling the same" mentioned in early American school records. One of the synthetic or word-building methods.

See ALPHABETIC METHODS; READING, TEACHING BEGINNERS.

A-B-C SCHOOLS. — A term commonly used in the past to designate the elementary school, when such schools gave the merest rudiments of learning. The institution is discussed in the following article.

See also DAME SCHOOL; PETTY SCHOOL; etc.

ABCDARIANS, ABECEDARIO, OR ABECEDARIE. — The name given to the teacher of children at the earliest stage, or to the children themselves. The term was used by Minsheu in his *Guide into Tongues* (1617) (see Murray's Oxford Dict.), but was probably in use long before that date. The teaching of the alphabet as preliminary to the learning of Latin gave rise to elementary textbooks extant at any rate as early as 1510 (see Watson's *English Grammar Schools*, chap. ix). Schools in which elementary instruction was carried on, which may be called abecedarian, were in existence in England in the Middle Ages under the names of A-B-C schools, Reading, Writing, and Song Schools. (See Leach's *English Schools at the Reformation.*) In the English organization of schools after the Reformation there was no systematic provision for elementary instruction. All that was done was done in the grammar school (*q.v.*). In 1582 Richard Mulcaster (*q.v.*) published his important *Elementarie*, detailing the well-considered methods for teaching reading, writing, drawing, vocal and instrumental music. Arithmetic is omitted. In spite of Mulcaster's plea for elementary schoolmasters as a separate organization, the elementary work had to be undertaken in the grammar school itself. The Statutes of Alford Grammar School (Lincolnshire) in 1599 require that "none" should be admitted before "he can read perfectly and write legibly," and that it is not the business of the schoolmaster to teach writing. But this (like similar statutes of other schools) was clearly a counsel of perfection. For in 1612 John Brinsley (*q.v.*) in his *Ludus Literarius*, bitterly complains that the grammar school should be troubled with teaching A B C. "The very little ones in most country towns would require a whole man of themselves to be always teaching the A B C and reading." It is to be noted that both Mulcaster and Brinsley plead for the teaching of sound English to the elementary pupils.

Though the main "burden" of teaching the young children, called "petties," fell often on the grammar schools, there were other unorganized agencies for their instruction. There can be no doubt that it was the intention of Edward VI's *Injunctions* of 1547 to require the continuance of the old Chantry priests (who played so conspicuous a part in elementary instruction in the pre-Reformation times in England — see Leach's *English Schools at the Reformation*). Chantry priests were required by these Injunctions to teach youth to read and write and to train them in "good manners and in virtuous exercises." "Every parish," says Mulcaster in his *Positions*, "hath a minister, if none else in the parish, who can teach writing and reading." So, too, the parish clerk in the Middle Ages had been often a beneficed cleric, who undertook elementary instruction, and there was a survival of the custom in Tudor and Stuart England, so that we are told of the alphabet inscribed on the church bell, suggesting that A-B-C schools were held in belfries. At the visitation of Dr. Richard

Montague, Bishop of Norwich, the inquiry is made, " Do any teach in your Church or Chancel? which is to the profanation of that place." Another survival from the Middle Ages was the Song Schoolmaster. In the Camden Society's reprint of a sermon by a Boy Bishop (*q.v.*) in Gloucester, 1558, it would appear that these schools were very badly conducted. It was only in 1905 that the last of the Song Schools (which combined the special teaching of music with elementary instruction) — namely, that of Newark (Nottinghamshire) disappeared. Churchwarden's accounts and town records show that schools of the abecedarian kind existed in England for elementary instruction, in some connection with the churches — from the Reformation continuously to what may be called the organization of the church elementary schools under the name of the Charity Schools (*q.v.*) at the beginning of the eighteenth century.

Besides the provision of teaching by the clergy, parish clerks, church schools, and the grammar school, there were a large number of voluntary, irregular, unlicensed (by the Bishop or his ordinary) private adventure schools (*q.v.*) of the " dame school " (*q.v.*) type. Edward (or Edmund) Coote (*q.v.*), master of the Free School at St. Edmunds Bury (Bury St. Edmunds), catered for these by his textbook *The English Schoolmaster*, issued in 1596. He states in his " Directions," " Thou mayest sit on thy shop-board, at thy looms, or at thy needle, and never hinder thy work to hear thy scholars after thou hast once made this little book familiar to thee." John Brinsley in 1612 makes a suggestion for passing over from the grammar school the teaching of " petties " in exact accordance with Coote's provision. " It would help some poor man or woman, *who knew not how to live otherwise*, and who might teach the petties well, if they were rightly directed." Another expedient for dealing with the abecedarians was that of Manchester Grammar School Statutes (1524), Guisborough Grammar School (1561), Rivington Grammar School (1566), and Bungay School (Suffolk, 1592). Boys from the highest form were deputed to give the abecedarian and elementary instruction. Thus early the pupil teacher system (*q.v.*) was instituted. In the main, however, outside of the grammar schools, abecedarian instruction was carried on in " dames schools." Coote had addressed his book to " men and women of trade, as tailors, weavers, seamsters, and such others as have undertaken the charge of teaching others." Occasionally a higher stamp of teacher was secured. Thomas Farnaby (*q.v.*), afterward one of the greatest classical scholars of his time, the founder of the most renowned of private grammar schools, had accompanied Drake on his last voyage, and on his return to England, as Anthony à Wood tells us, " stooped so low," *c.* 1596, as to be an abecedarian, at Martock in Somersetshire. But in 1660 Charles Hoole (*q.v.*) in his " Petty Schools," one of the divisions of his *New Discovery of the Old Art of Teaching School*, speaks of the " Petty School " as being " left as a work for poor women or others whose necessities compel them to undertake it *as a mere shelter from beggary.*"

Hoole's account of what a petty school should be is the most outstanding document of elementary education in England up to the time of the Restoration. He gives in detail a careful method for teaching the alphabet and early spelling, and advocates the teaching of simple English literature to the " petties." Teaching should be placed in the hands of responsible teachers — to be paid at least twenty pounds a year (a not inconsiderable amount in those times), with a house provided. Fees should be required from those able to pay, but poor boys should be admitted free of cost. Hoole urges the wealthy to erect and endow such " Petty " schools. No more than 40 boys are to be allotted to each master. The school should have four forms. In the lowest, the letters of the alphabet are to be learned from the primer. In the second, spelling is to be learned from the Psalter. In the third, reading from the Bible. In the fourth form, reading, writing, casting of accounts, and profitable English books. Hoole further hints at the training of such teachers on a similar scheme to that suggested by Matthew Poole in 1658 in his *Model for the maintaining of students of choice abilities at the University, principally in order to the ministry.* Nearer the end of the seventeenth century William Walker, in *Some Improvements to the Art of teaching*, suggested an inquiry from authority with a view to the reformation of " ignorant and injudicious petit schoolmasters and school-madams." Many of the free schools established in the seventeenth century with buildings and endowments of pious benefactors were elementary schools. They were sometimes established to instruct in reading and writing (sometimes also in arithmetic), and also sometimes to provide premiums for putting boys and girls out to apprenticeship. The first Dissenters' English Charity School was founded in Gravel Lane, Southwark, in 1687. In 1699 the Society for Promoting Christian Knowledge (*q.v.*) was established, and from that time forward for many years elementary education was chiefly associated with the Charity Schools (*q.v.*) in connection with that society.

In America the term was used throughout the colonial period and well into the nineteenth century to indicate the children engaged in learning the alphabet and the process of reading rather than to indicate the teacher. In general the work of the abecedarian was of a most mechanical character, — mere rote work, — and when better methods of elementary teaching were introduced in the first half of the nineteenth century, the term fell into disuse. In fact, the term was used quite often to indicate the peculiar rote work by which the alphabet was taught: the teacher, pointing to the letter, saying *a*, the child repeating, *a;* and so through the alphabet (see Warren Burton, *The District School as it was*, 1833, for a full description of this method). Henry Barnard, commenting on the work of the abecedarian, in the early nineteenth century, says: " If a child be bright, the time which passes during this lesson is the only part of the day when he does not think. Not a single faculty of the mind is occupied except that of imitating sounds; and even the number of these imitations amounts only to twenty-six. A parrot or an idiot could do the same thing."

During the early colonial period the same effort was made in the colonies that was made in England to relegate the work of the abecedarian to the home or to the dame school and to keep it out from the town school, even when an English rather than a Latin school. Thus the agreement between the feoffees of the school of Roxbury, founded 1645, and their schoolmaster in 1668, contains the following clause, " Whereupon ye said John Prudden doth promise and engage to use his best skill and endeavours, both by precept and example, to instruct in all scholasticall, morall, and theologicall discipline, the children (so far as they are or shall be capable) of those persons whose names are here underwritten, all A B C Darians excepted." This attitude towards the abecedarian was continued in some of the larger towns until well into the nineteenth century, though for the most part the local school — town or parish — had included, long before, both the dame school and private abecedarian instruction.

In Massachusetts, for example, the law provided that " no youth shall be sent to the Grammar Schools, unless they shall have learned in some other school, or in some other way, to read the English language, by spelling the same"; and also provided for the establishment of preparatory schools to perform this service. In Boston, however, such schools had not been established by the school authorities, and in 1817 it was found that there were more than 4000 children in 162 private schools. The discovery of these conditions led to the establishment of a Primary School Committee to establish and oversee such elementary schools, in addition to the School Committee of long standing. This separate organization of the schools continued until 1855. In most communities, however, the abecedarian had long since been absorbed into the regular public schools.

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See DAME SCHOOL; ELEMENTARY EDUCATION; ENGLAND, EDUCATION IN; COLONIAL PERIOD IN AMERICAN EDUCATION.

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ABELARD (ABAILARD), PETER (1079–1142). — The most famous teacher of the twelfth century; he was born near Nantes in 1079. He has left an invaluable sketch of his life in a long letter which contains *The Story of his Disasters* (*Historia calamitatum*). No other document of the twelfth century casts so much light on the conditions preceding the rise of the universities. As a young man he went forth to engage in discussion (*disputando*) in all those places in France where he had heard that the science of dialectic was cultivated. At the cathedral school of Notre Dame in Paris he encountered William of Champeaux (*q.v.*), and quickly aroused his hostility by refuting some of his doctrines. He then began to lecture in the neighborhood of Paris, and attracted many students. After a period of retirement due to illness, he returned to study rhetoric under William, and claims to have permanently discredited him by forcing him to retract or revise his statement of the nature of universals. Abélard then taught logic and " grammar " — to wit the Latin classics — for a time in Paris; but determined to turn to theology, and betook himself to Anselm of Laon. He speedily wearied of the old man's lectures, and tells us how he himself began rival lectures on the book of Ezekiel, to the great delight of the students, but to the scandal of the ecclesiastical authorities, since he had no license to teach. On returning to Paris he found that William of Champeaux had withdrawn, and he was permitted to lecture regularly in the cathedral school. His distinction as a theologian attracted many students, but at the height of his success the tragedy which has rendered his name immortal — his connection with his pupil Héloïse and the horrible revenge of her uncle — led to his retirement to a monastery. Later he became a hermit in Champagne, but hundreds of students continued to flock to him. The end of his life was embittered by a prosecution for heresy conducted by St. Bernard. He was condemned by the Council of Sens in 1141 for the alleged heresies of his works, and was sentenced to imprisonment, but allowed to retire to the monastery of Cluny. He died the following year (1142).

The main secret of Abélard's power of attracting students was doubtless his stimulating rationalism, his skill in discrediting the positions of less thoughtful rivals, and his remarkable range of reading, which enabled him to illustrate and enliven his lectures. The modern reader is not so likely to seek Abélard's spirit in his longer theological works and sermons as in his interesting *Dialogue between a Philosopher, a Jew and a Christian*, and especially in his famous *Sic et Non*. The introduction to the latter work gives us indeed a key to Abélard's intellectual tendencies. There are, he declares, many obvious contradictions and obscurities in the innumerable writings of the Church Fathers, and our respect for their authority should not prevent us from trying to come at the truth. In so doing we need not impugn their good faith and insight. They themselves freely point out one another's mistakes and even admit, as does Augustine (*q.v.*), that they are subject to error. There are many obvious reasons why ancient writings are difficult to understand and are subject to varying interpretations. A writer may, for example, employ different terms to mean the same thing, in order to avoid a monotonous repetition of the same word. Familiar, vague words may be selected so as to appeal to the intelligence of the common folk; and sometimes a writer sacrifices perfect accuracy in the interest of a clear general statement. Then, poetic language is often obscure and vague. Moreover, the Fathers often relied on the opinions of others, and often introduce erroneous views and leave the reader to distinguish between the true and the false. In the case of the Scriptures, while we may not say that the writers erred, we may suspect that the scribe made a blunder in copying the manuscript or that there is an error in interpretation, or that the passage is not understood. In view of these considerations and of the necessity of cultivating the critical powers of his students, Abélard brought together a selection of the questions on which the Fathers appeared to disagree, beginning significantly enough with the fundamental query, "Should human faith be based on reason or no?" He gives the opposing authorities, but offers no solution, for he maintains that the unsolved problems would excite tender readers to a zealous inquiry into the truth, and so sharpen their wits. "The master-key of knowledge is indeed a persistent and frequent questioning," for did not Aristotle, the most clear-sighted of all philosophers, desire above all other things to arouse this questioning spirit? "By doubting we come to examine, and by examining we come to the truth."

Here is the basis for the type of higher criticism which was only to prevail centuries after Abélard was in his grave. The scholastic philosophers of the thirteenth century were as bold as Abélard in the questions they proposed and in the difficulties they raised, but they were always careful in their lectures and works to supply the correct answer to them. To Abélard, at least in his younger days, must be attributed the chief rôle in arousing that intellectual enthusiasm which attracted thousands of students to Paris and led to the development, a generation after his death, of the cathedral school of Notre Dame into the "universitas," or professors' guild, of Paris.

J. H. R.

See Universities.

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ABERDEEN, THE UNIVERSITY OF.— A coeducational institution located at Aberdeen, Scotland. It consists of two colleges having an independent origin and endowment. The older institution, called King's College, was founded in 1494 under a Papal bull obtained at the instance of King James IV. The other institution, that of Marischal College, was founded in 1593 by George Keith, fifth Earl Marischal of Scotland, under a Charter ratified by Parliament. Both colleges maintained an independent existence, exercising University rights and privileges until 1858, when they were united into one corporate body called the University of Aberdeen. The University buildings, formerly of King's College, are situated in the older part of the city, and here are conducted the Divinity classes and most of the Arts classes; Marischal College is situated in the new town, but nothing remains of the original buildings, and recently extensive additions have been made, and here are conducted the remaining courses provided by the University. At present the educational work is divided into five faculties or departments, viz: The faculties of Arts, Science, Divinity, Law and Medicine, and degrees are granted to students successfully undergoing courses of study in the respective Faculties. The only vocational degree conferred by the University for other than the learned professions is the Bachelor of Science in the department of Agriculture, which falls under the Faculty of Science. The total number of students in attendance numbers between 1200 and 1300, of whom about 900 are students proceeding to graduation in one or more of the faculties. The Faculty of Arts, formerly attended by students desirous of extending their general education, is now largely composed of teacher students and is the largest in number, having over 450 students; Medicine comes next, with somewhere about 300 graduating students; the Faculties of Law and Divinity have a comparatively small number of graduating students. The Faculty of Science, instituted only in 1889, is gradually increasing in numbers. The income of the University is derived mainly from four sources: (1) Fees of students; (2) Endowments; (3) Grants by the State; (4) Grants from the Carnegie Trust for the endowment and aid of the Universities of Scotland. A. D.

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ABILITY, GENERAL AND SPECIAL: — By ability is meant the power of the individual to produce results. The conception includes all the functions that one may possess, — the organic functions, the powers of movement, the powers of sensation, the higher psychic powers, and the activities which they condition. Ability covers both ability to do and ability to learn, the latter power revealing itself in modifications of the former.

The largest contrast between types of ability is ordinarily thought to be that between our mental and our physical powers. There is, however, an intimate connection between the two. This connection is by most psychologists supposed to be so close that in the terms of Professor James' working hypothesis " the immediate condition of a state of consciousness is an activity of some sort in the cerebral hemispheres, and " all mental states are followed by bodily activity of some sort." The so-called " functional " psychology conceives of consciousness as existing in order to modify or to readjust the reflex or habitual physiological reactions of the organism when these prove ill adapted. In that event, it must certainly depend upon a physiological stimulus, for it is only for the sake of facilitating the proper responses to such stimuli that it exists. On the other hand, it must result in movements, for the control of these reactions constitutes its function.

Since mental ability is concerned in the task of learning, or of readjustment, the distinction between ability to do and ability to learn would seem to be more fundamental than that between mental and physical ability. The two powers, that of doing and that of learning, are, again, as intimately interconnected as are the mind and body. In order to readjust, or to learn, it is necessary that the individual should have the ability to be sensitive to lack of adjustment, the ability to perform experimental acts with a view toward discovering a reaction that will prove adaptive, and the ability to feel or know when this successful reaction is or is not found. The first and the last of these powers are closely associated, if not identical. Sensitivity to lack of adjustment will not only stimulate experimentation toward a better condition, but will indicate when this experimentation is as yet unsuccessful. Such sensitivity has been called affective consciousness, or feeling, and in this we have the first important type of mental ability. If one has no feeling, one cannot learn. Feeling stimulates the learning process, and directs it by compelling the inhibition or elimination of unsuccessful reactions. Without such feeling experimentation or learning could neither begin nor end.

On the other hand, learning depends quite as much on the power to make experimental reactions as it does on feeling. The possibilities in the way of experimentation may include the sum total of the reactions that the individual can make. Power to learn rests on the number and variety of such reactions and on the ability to make them in an experimental way, — that is, in situations other than those to which they by heredity or habit are associated. Thus to learn rests back upon power to do.

The reactions that an individual can make cluster about certain large functions. These functions correspond to needs of the organism. They are its instincts. Heredity and habit attach certain reactions to the sense of certain needs. Ability to do, therefore, rests back on one's equipment of instincts, to satisfy which the reactions are made.

Just as ability to do depends on the instincts, or needs, of the individual, and the reactions that can be made in order to fulfill them, so ability to learn depends on one's power to readjust the reactions, so that when the hereditary or habitual ways of satisfying certain instincts fail, other methods can be substituted. The diversity of organs and structures connected with the body form the physiological basis of the ability to do; the central nervous system is in the main the physiological basis of the power to learn. By it all parts of the body are interconnected, so that the need of any part can be met by the reactions that can be performed by any other part. Thus in any emergency one can shift rapidly from one to another of his possibilities of action, and learning becomes possible.

The kind of learning that involves merely directive feeling and the power to make experimental activity is often called " learning by trial and error." It is the simpler method of readjustment. The higher method of learning may be called " conscious learning." The individual who learns consciously does not hasten blindly through a lot of experimental movements, but instead reflects upon ideas of movements, or plans of action, and considers what is likely to be the outcome of each and its relative advantages and disadvantages. Thus for experimental movements he has experimental ideas. But in order to have these ideas he must cognize the nature of the situations with which he deals, he must retain an account of these cognitions in memory, and be able to recall them when needed in new emergencies. He must be able to perceive, to imagine, and to conceive. Such consciousness, in contrast with feeling, or affective consciousness, may be called cognitive consciousness. As affective consciousness stimulates experimentation and eliminates the unsuccessful experiments, so cognitive consciousness provides ideas to take the place of actual experiments, with a great resulting gain in avoidance of destruction, effort, and, in general, the wear and tear of the blind struggle to evolve a better way of doing things. Affective consciousness may be characterized as selective consciousness; cognitive consciousness is descriptive. It describes the conditions and results of experimentation.

Cognitive consciousness finds its foundation in the different qualities that are noted because of the differentiation of our powers of sensation. These qualities are discriminated as a result of recall and comparision by what is known as perception. Perception discriminates and gives meaning to sensation. Imagination reproduces perception with variations more or less radical from the original. Conception seizes and abstracts the relationships among experiences. Finally, judgment appears to give a cognitive basis for the process of selection among ideas. In judgment cognition encroaches upon the selective function that was originally performed solely by feeling. Thus all the varieties of cognition can be interpreted from the point of view of their function in connection with the work of learning or readjustment.

The physiological foundation of these higher mental powers is found in the cerebral cortex, which is conceived to be the organ of memory, and so of the recall, comparison, and analysis of experience. This function may be regarded as the secondary function of the hemispheres, the primary function being that of bringing together all parts of the body, so that learning by a quick resort to one after another reaction until a successful one is found may be made easy.

The descriptions of cognition find their function not merely as an aid to the successful prosecution of the experimentation in connection with which they are acquired, but also in future emergencies when they are recalled. Indeed, this latter use soon overshadows the former. Before the child has acquired much experience, he learns by trial and error. This learning is not at first favored especially by cognition. Later, however, as experience accumulates, actual experimenting is cut short, and at length very considerably replaced by foresight. The fact that the process of acquiring ideas is to such an extent separated from that of utilizing them has made mental life seem to be independent of the utilities of physical adjustment. Mental ability has been conceived to be concerned in a different set of interests from physical ability, and hence somewhat sharply differentiated therefrom.

The tendency to think of mental ability as a thing apart from physical ability and so of the general utilities of the life of the individual is apparent in the older psychology. Connected with this was the classification of mental abilities according to what were known as the faculties. This classification recognized that mental ability was not a unitary affair, but rather specialized. It conceived the various processes to which the mind submits its experience to be distinct, and held that men might differ from each other in respect to these. Some excel in perception, others in memory or imagination, others in reasoning; some surpass in judgment, while some show extraordinary powers of will. General ability reduces itself to a sum of special abilities, and the special abilities of the mind are held to be the faculties. When in the history of psychology the powers of the mind came to be more and more connected with the body and especially with the brain, a school arose which strove to locate the various faculties in different portions of that organ. These men, the phrenologists (*q.v.*), offered a far more minute subdivision of the faculties than that just indicated. As many as 43 faculties could, according to Fowler, be distinguished and located. Spurzheim's (*q.v.*) list included such traits as combativeness, cautiousness, hope, comparison.

The faculty theory may be regarded as a sort of psychological realism. The reality, so far as mental ability is concerned, is thought to lie in a power that is manifested in a formal process. Not any single mental activity as a whole, but those universal aspects which appear in the common forms of many different activities, is held to be the true essence of mind. This abstract formal ability Herbart rejected in favor of what he called apperception (*q.v.*). On the theory of apperception, mental activity consists in the interpretation of sensation by memory, in the fusion of new and old experience. Hence mental ability was made by him a function of the previous experience of the individual. Instead of being an abstract power, it was regarded as immediately dependent on the concrete content of consciousness.

It will be noticed that the theory of apperception can be easily associated with the functional theory of mind. For while it does not explicitly take the view that consciousness exists for the sake of readjustment, it regards mental ability as consisting in the functioning of the experience that has been acquired by the individual. The new situation is illuminated by the old experience, according to Herbart; it suggests a number of ideas as to the possible ways of dealing with it, according to the functional psychology.

The functional psychology does, however, make a marked advance upon the Herbartian analysis of mental ability. For by it instinct and the possibilities in the way of overt activity on the part of the individual are conceived to lie back of the possibility of accumulating and using experience. Thus, according to Herbart, interest, which is essential to the effectiveness of mental activity, is conceived to be a result of apperception. The functional psychology would make interest the ground of apperception. The older thinker holds that thinking is based on previous experience; the newer school traces that previous experience back to the reactions and the instincts, the readjustment of the relations between which was the original stimulus to cognition.

The Herbartian view of mental ability departs from the realism of the faculty theory toward a psychological nominalism that recognizes in the particular experience rather than in the general power the true foundation of mental activity. Mental ability becomes on this basis the sum of an enormous mass of special abilities. We find these abilities ranging themselves in great groups according to the interrelations of the phases of experience of which they consist. Power goes in fields, and one's ability in any field depends on his mastery of the experience that can be said to make it up. This same psychological nominalism may be said to be present in the view of the functional psychology, with the difference that ability is thought to cluster about instincts, for it is in the functioning of these that experience is by this school conceived to be acquired.

The theory that mental ability can be classified into faculties received quite as telling a blow from the researches into the relation of mind and brain as it did from the analysis of Herbart. Curiously enough, these researches began with the phrenologists, Gall and Spurzheim, who, as we have seen, pushed the faculty theory to an extreme. As knowledge of the localization of the functions of the brain increased, however, it became apparent that these were associated with the various senses and motor organs of the body. Brain activity was found to consist in the reception of sensory currents and the transformation of these into motor impulses through a more or less complicated machinery of association, the nature of which is much dependent upon the earlier experiences of the individual concerned. Thus mental ability was founded on the possession of the special senses and well-equipped brain tracts associated therewith, together with an apparatus for associating these regions with the motor areas. The definite organization of these associations by which power to do is achieved is a result partly of heredity and partly of the practice and experience of the individual.

The view that mental ability consists of a great mass of special abilities more or less intimately related with each other seems fairly well borne out by researches into the correlation of mental traits. A great mass of these are collected by Professor Thorndike (*Educational Psychology*). For example, he found that one's power to remember a series of figures might vary widely according to whether this series were presented to the eye or to the ear. If a number of individuals were tested in both exercises, the relative standing of any one in auditory memory would not be the same as that in visual memory, although the two functions would have some positive relation to each other. The definite correlation he discovered was from 29 to 39 per cent. The correlation between power to remember the contents of a passage and a list of figures, both presented to the ear, was found to be only 4 to 5 per cent; whereas that between the power to remember a passage presented to the ear and one presented to the eye was 90 per cent.

These results in regard to memory are typical of correlations of specific powers of discrimination, rapidity and accuracy of reaction, etc. Wherever the nature of the material with which the individual was called upon to deal varied, there some variation in the power of the mind to cope with it was discovered. Similar results were obtained from a comparison of the relative ability displayed by students in various school subjects as indicated by the marks received therein. Dr. Wissler found a correlation of standing in Latin with standing in mathematics of 58 per cent. Latin showed 60 per cent correlation with German and 75 per cent with Greek. It is evident that the degree of relationship between the subjects is reflected in the relative ability of students in them.

One of the most important questions regarding ability is that of the respective parts of heredity and of education in determining it. On this matter two distinct questions may be raised. The one concerns the character and the other the relative amount of the material derived from either source. On the question of the character of the contribution of heredity and education to one's ability, the view that the former agency gives the general basis of our intellectual and physical powers, while the latter one trains and specializes these, is commonly held. This conception finds support in a comparison of the abilities of the lower animals and man. As we descend in the scale of life, we find less and less capacity for education, more and more dependence on heredity. Moreover, it is seen that the specific nature of the activities of the brutes is determined largely by instinct. In man, however, as Professor James points out, although the instincts are even more numerous than in the lower animals, they are more vague, more imperfect. They are just mere needs or desires, the specific method of gratifying which is largely left to the control of education. Man inherits many instincts, the power to do many things, and a nervous system that permits, on the one hand, the formation of the greatest variety of habits, or associations between stimuli and movements, and, on the other, the acquisition of a great mass of directive experience. The specific character of the habits and experience which he acquires depends upon education.

As regards the relative amount of material derived from the two sources, there are a great number of studies, of which Galton's *Hereditary*

Genius (New York, 1884), Wood's *Mental and Moral Heredity in Royalty* (New York, 1906), and Thorndike's *Measurements of Twins* (New York, 1905) are among the most noteworthy. Galton concludes that there is a marked tendency for genius, superior ability, height, eye color, special kinds of artistic power, and other traits to be hereditary. Thorndike found that inheritance has a most pronounced effect on such minute powers as those of spelling, writing, addition, and multiplication, as shown by the extraordinary resemblance of twins in these respects, — a resemblance not to be accounted for by training, since others who had received the same training did not show it. He concludes that "heredity itself is highly specialized." In general the investigators agree that education can fashion one to mediocre efficiency, but that it cannot produce marked ability.

See Formal Discipline; Discipline.

E. N. H.

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ABITURIENTENPRÜFUNG. — Also Abgangs-, Maturitäts-, or Reifeprüfung. — The final leaving examination in a German high school with a nine years' course, introduced in 1788. The following is the procedure for the examination in Prussia. The examination can only be taken by those who have reached the *Prima*, or highest class. The faculty decides who shall be admitted to the examination, which in scope and character is limited to the work of the *Prima*. The examining commission consists of the director, the faculty of the highest class, and a representative of the Provincial School Board (see Germany, Educational System in). Suitable questions for the examination are submitted by the teachers to the director, who gives his approval and submits the questions to the representative of the Provincial School Board for selection. The examination is both written and oral, but candidates who present good written papers may be excused from the oral. In the *Gymnasium* the examination includes: (1) A German essay; (2) a translation from German into Latin; (3) a translation from the Greek; (4) from the French into German; and (5) four problems in mathematics. The oral examination includes Latin, Greek, religion, history, and mathematics. There is a system of balancing up bad papers with the good, except that no candidate will be passed who fails in German or both classical languages. In the *Realgymnasium* and the *Oberrealschule* the examination includes: (1) a German essay; (2) a French or English essay; (3) a translation from German into French or English; (4) four problems in mathematics; (5) one problem in physics or chemistry. In the former there is in addition (6) a translation from Latin into German. The oral examination includes religion, French, English, history, mathematics, physics, or chemistry.

The *Abiturientenprüfung* is not only a test of scholarship, but success in it carries with it several privileges, all of which are since 1902 enjoyed equally by the *Realgymnasium* and *Oberrealschule* with the *Gymnasium.* The passing of the final examination is obligatory for admission to the universities and the learned professions since 1834, with the exception that graduates of the *Oberrealschule* must make up Latin before they can be admitted to the study of medicine, and that candidates for theology must have a knowledge of Latin and Greek, the certificates of the leaving examination now have equal value. A further privilege carried by this examination is the admission, after pursuing certain studies, to all posts in the state service. The *Abiturientenprüfung* serves to secure a certain standard of uniformity in the standards of the high schools throughout the German states, since it is practically the only recognized examination for entrance to full enjoyment of university privileges.

See Germany, Education in.

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ABNORMAL. — A term descriptive of marked physical and mental deviation from the condition generally found in the particular class to which reference is made. Some writers incorrectly use the word as a synonym of "pathological." The latter term, however, always implies a state or condition in which there is some interference with the normal functions, as in disease, whereas "abnormal" includes other types of deviation as well. A double-yolked egg is abnormal, but not pathological; a man fifty-four inches tall may be only abnormal, whereas a man of the same height who is a cretin (dwarf due to insufficient or absent thyroid secretion) is not only abnormal, but also pathological; all hallucinations are abnormal, while only a limited number of them are pathological.

From time to time attempts have been made to classify bodily and mental abnormalities, but on account of the diversity of the material and the efforts to make the schemes all-inclusive, the plans are not suitable for psychological or educational purposes. The difficulties of classifying pathological abnormalities are not so great as those of classifying all abnormalities, but the pathological abnormalities are sufficiently varied in character to require more than one method of grouping.

For convenience here we may group the bodily and mental activities which are of educational importance into three classes: sensation, association, and movement. In such of these classes of activities we may find the following kinds of abnormalities: (*a*) absence or loss, (*b*) decrease, and (*c*) increase. The important abnormalities on this basis of classification in each of the three classes are given in Tables I, II, III, respectively.

TABLE I

Sensation Abnormalities

Normal Conditions	Abnormal Conditions		
	Absence or Loss	Decrease	Increase
vision	blindness	amblyopia	
hearing	deafness	partial deafness	hyperacusis
taste	ageusia		
smell	anosmia		hyperosmia
touch	anæsthesia	hypoæsthesia	hyperæsthesia
pain	analgesia	hypoalgesia	hyperalgesia
temperature	thermoanæsthesia	thermohypoæsthesia	thermohyperæsthesia

TABLE II

Association Abnormalities

Normal Process	Abnormal Conditions		
	Absence or Loss	Decrease	Increase
memory	amnesia	varying degrees of amnesia	hypermnesia
speech	dumbness aphasia	partial aphasias	
attention	aprosexia		hyperprosexia

TABLE III

Movement Abnormalities

Absence or Loss	Decrease	Increase
paralysis	paresis retardation	spasm tic convulsion cramp

For a complete division of speech abnormalities the reader is referred to the articles on speech defects, aphasia and those mentioned under the latter topic.

In addition to the abnormalities mentioned in the three tables, there are many others not so distinctly losses, decreases, or increases in function. Many of these are complex in character, and, if the classification purports to be complete, they ought to be grouped under two or more headings. All difficulties in movement and all sensation deficiencies may be considered partial losses, but many of the movement abnormalities depend upon sensation losses, and some of the sensation abnormalities are dependent upon disturbances in movement ability. We may, however, disregard the finer distinctions in this place, and classify the material solely as a convenience. For the more careful analysis of many of the conditions the reader is referred to the articles dealing with the separate topics.

Following are lists of abnormalities that cannot be properly classed in the foregoing tables, but which have many points of similarity to those already mentioned. Vision: decrease — color blindness, hemianopsia, contractions of the visual field. Hearing: decrease — tone deafness; increase — tinnitus aurium (a subjective tinkling sound). Memory: decrease — lapses, forgetfulness. Speech: decrease — aphonia, hoarseness. Attention: decrease — distraction. Movement: increase — tremor, contracture, impulsion, catalepsy, athetosis; decrease — ataxia, weakness.

All the abnormalities mentioned thus far may be considered quantitative variations from the normal, but there are other abnormalities that may more properly be called variations in quality. Some of these, but not all, may be described as perversions of normal conditions. Under this heading (qualitative abnormalities) the most common are: hallucinations, illusions, delusions, allochiria, polyæsthesia, vertigo, diacusis (unpleasant sensation from ordinary stimuli), parosmia (smell perversion), kakosmia (subjective smell sensations of an offensive character), and parageusia (taste perversion).

There are two very general mental abnormalities, each composed of a number of perverted, decreased, or increased functions. These two general conditions are commonly called insanity and feeble-mindedness.

The latter term is used in describing individuals who have not attained a normal mental status, when compared with other individuals in the community. Those individuals are called insane who have shown marked deviation from their own normal manner of feeling, thinking, and acting. The distinctions between the two classes is brought out in more detail in the articles dealing with these topics. S. I. F.

ABSENT-MINDEDNESS. — See Attention.

ABSENTIA, DEGREES IN. — The conferment of a degree on a candidate who has fulfilled the necessary requirements for it, but is unable to be present. The presentation for degrees was for so long an important feature in a student's career, connected as it generally was with disputations, that although the form has disappeared, the ceremonial, which is more picturesque than significant, has been retained even by those universities which cannot look back to the period when the degree conferment meant something. Hence the practice of insisting that all candidates for degrees be present in person is almost universal in Great Britain and very common in America. In Great Britain degrees *in absentia* will generally not be granted unless the candidate is out of the country. In case of illness candidates must appear at a subsequent conferment. In many universities an intermediate conferment during the year has been introduced, when it is usual to charge an additional fee. When degrees are conferred *in absentia*, the names of the candidates are read out after the conferment of similar degrees. At Oxford degrees *in absentia* are only conferred on candidates resident abroad and occupied in business or profession or study, who have fulfilled the statutory requirements, as, for example, submitting a dissertation, obtaining a grace from their college, or, if the degree is in divinity, subscribing to the statutory declaration. In addition an extra payment of £5 is required. In American colleges the practice varies. The presence of all candidates is usually expected, but the requirements are more stringent for those who are proceeding to the first degree.

See Degrees.

ABSTRACT AND CONCRETE. — See Concrete and Abstract.

ABSTRACTION. — A term of logic meaning the separation, for *intellectual* purposes only, of a quality from the thing to which it belongs, or a relation from the pair of things between which it subsists. Its possibility rests upon capacity for *selective* attention, in virtue of which some trait not sensuously conspicuous or intense is dwelt upon because of its importance in relation to some conceived end. While the brutes have great power of concentration, there is great doubt whether (except perhaps in the case of some of the higher apes and monkeys) they have the power of selective attention. Since reasoning depends upon the capacity to treat an extracted quality or relation as a sample or typical instance, rational thought is dependent on abstraction or selective attention. The consideration of some quality or relation irrespective of the particular context in which it is found is obviously an indispensable prerequisite for all generalization (*q.v.*), so much so that it may be put down as a general principle that abstraction exists for the sake of a resulting generalization. If this principle were uniformly borne in mind in education, there would be little occasion for the attacks which educational reformers have made upon the proneness of instruction to run into abstractions; for it will be found that the abstract in the sense of the unduly abstruse, the excessively theoretical and useless, always means abstraction arrested, so that it has become an end in itself instead of a preliminary to recognition of a general principle.
J. D.

See Concrete and Abstract.

ABSTRACTION. — A term used along with "comparison" to describe the "third step" in the procedure of the recitation, or "inductive development lesson."

See Comparisons and Abstraction; Recitation, Method of.

ABUL–WEFA. — Mohamed ben Mohammed ben Jahjā ben Ismā ʻīl ben el-ʻAbbās, Abū'l-Wefā el-Būzjanī, one of the greatest teachers and mathematicians among the Arabs, was born in Būzjān near Nīsābūr in 940, and died in 997. He wrote on arithmetic, geometry, and algebra, and edited various works of Al–Khowarazmi (*q.v.*), Euclid (*q.v.*), Diophantus (*q.v.*), and Hipparchus (*q.v.*). D. E. S.

ABULIA. — A symptom in many mental diseases, consisting essentially in a decrease or absence of will power, and in a falling off of attention. In neurasthenia and in psychasthenia the abulia is incomplete, but in such conditions as hysteria there may be a loss of all voluntary action. All actions are not equally affected, for it is found that those of a reflex and instinctive nature are usually retained, while only those of a more complex nature are lost. In hysteria the abulia may be so marked as to simulate a complete paralysis, but the paralyses of organic origin are not usually considered abulias.

See Psychasthenia, Neurasthenia, and Hysteria.

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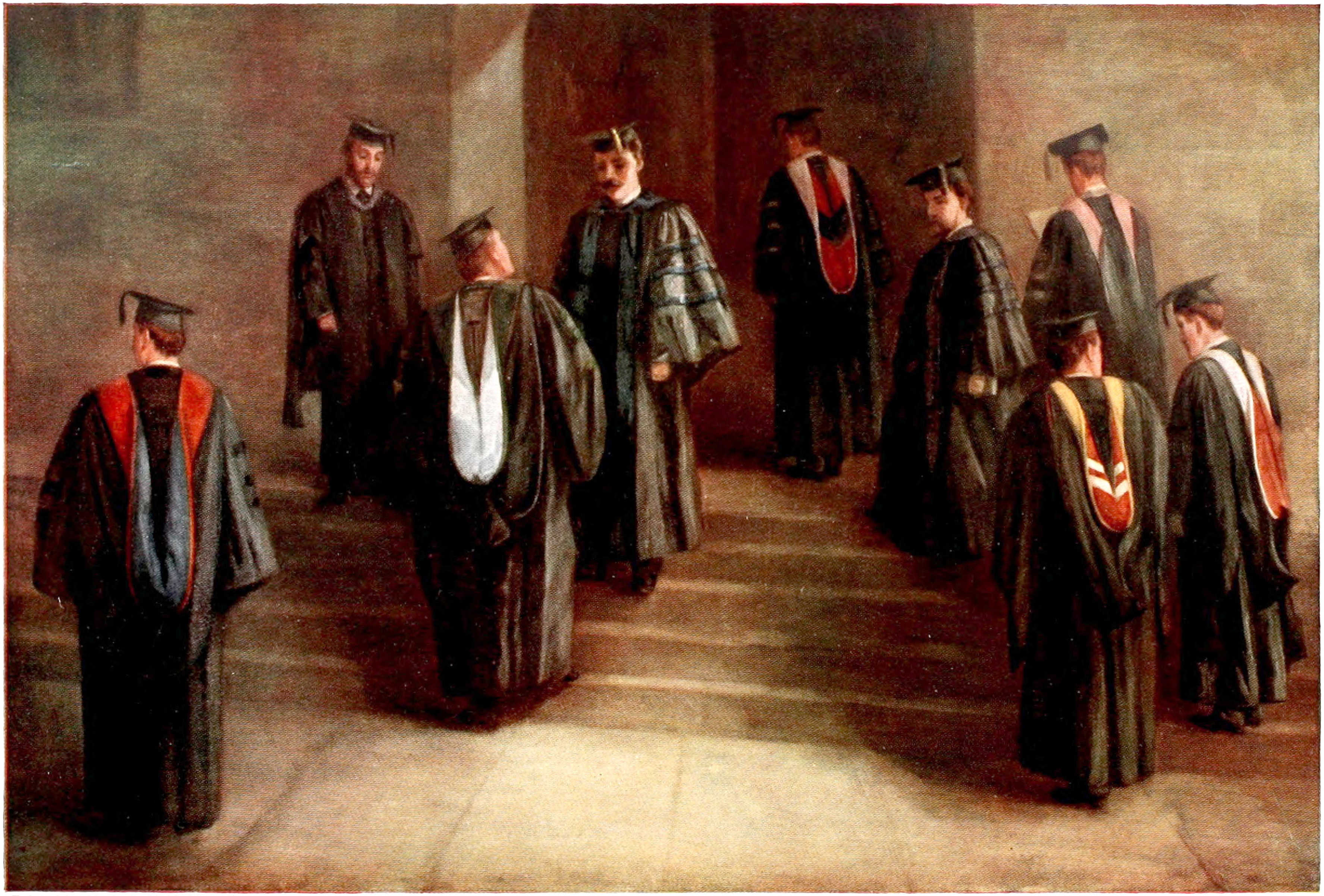
ACADEMIC COSTUME. — In this country as in Europe academic costume consists principally of caps, gowns, and hoods of forms that have become specialized and used as outer garments by students, holders of degrees, and officials in universities, colleges, and other institutions of learning. It is closely related to the professional costume used by members of the bench and bar in many countries, by the clergy and choirs in many churches, by various fraternal orders in ceremonial exercises, and has many features in common with the medieval dress still used by ancient guilds. The noticeable feature is the long, full, flowing gown or robe, which seems to have been inherited from the twelfth and thirteenth centuries, when the universities were finding a form which recognized a democratic factor in the self-governing powers, but under a headship appointed by the Church. The scholars were clerics, and so their robes were not far different from those of other clerical orders.

It seems to have been at this time that the dress of the friars and nuns became fixed. Flowing robes were the dignified dress of the times, and special forms which were set aside for the use of the various parts of the university body have persisted with modifications down to



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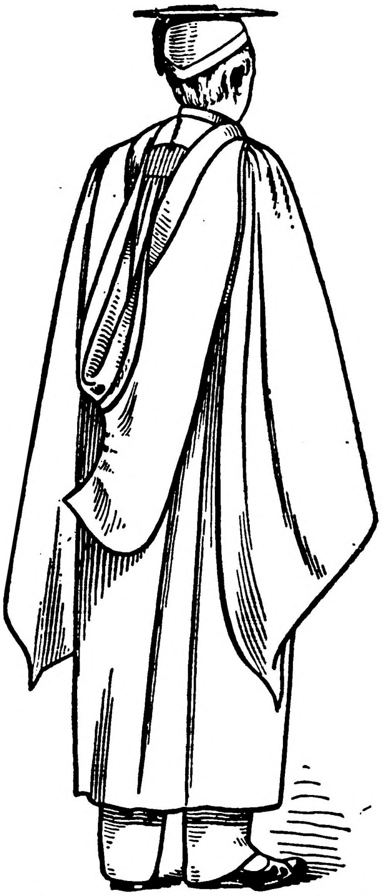
AMERICAN INTERCOLLEGIATE SYSTEM.

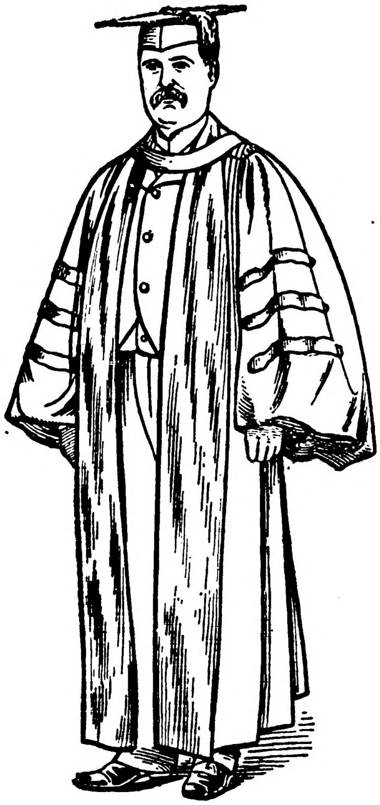
D.D. (Yale). LL.M. M.D. (Columbia). PH.D. Litt.D. (U. of Pa.). LL.D. MUS.D.

B.S. (Cornell). M.A. (U. of Chicago).

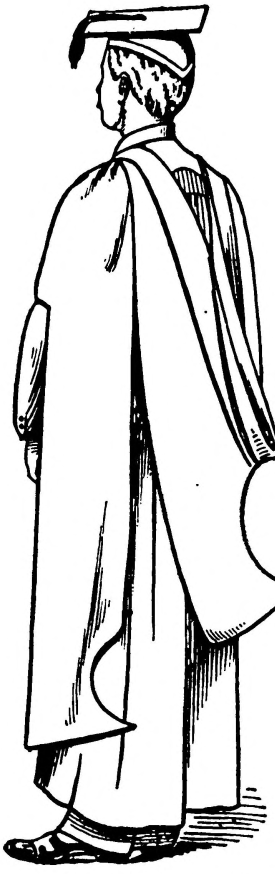
the present. The cold buildings of medieval times required capes and hoods for warmth. The cap replaced the hood for the head and the cape with hood was modified into the present hood, which by colors, trimming, and linings becomes perhaps the most noticeable and significant part of the costume in British, Colonial, and American colleges. Full black robes are used by professors in German universities on their ceremonial occasions; in the University of Paris the costume is a gown of black with colored facings, with a colored scarf hanging from the shoulder and a high turban with a colored crown. Different colors denote different faculties. For high occasions they have gorgeous robes made largely of silk of the faculty colors—scarlet, crimson, and yellow.



Bachelor's Cap, Gown, and Hood.



Doctor's Cap and Gown.



Master's Cap, Gown, and Hood.

Academic costume is largely used in the colleges and universities of the British Empire and the United States. In the former, each university has its own empirical usage, small relationship being discoverable between the various codes, except in the shapes of the caps, gowns, and hoods. The colorings are unrelated, except that red gowns and red hoods are indicative of a doctorate. In the United States there is in general use a uniform system adaptable to each institution, and differing at each institution only in the college colors which line the hoods.

In the colored plate, illustrating the American usage, the hood linings are seen treated heraldically as inverted shields, the colors being arranged as one or more chevrons of the secondary color, upon a ground of the primary college color, or divided parti-per-chevron. Where the same colors have been used by different institutions, — generally widely separated, — different shades of the same colors have been followed. In the British plate, the empirical character of the usage is evident.

The following are the codes of Oxford, Cambridge, and Edinburgh:—

UNIVERSITY OF OXFORD

B.A.	M.B.
Gown. Black stuff. Hood. Black stuff trimmed with white fur.	Gown. Black silk. Hood. Blue silk trimmed with white fur.
M.A.	M.D.
Gown. Black silk. Hood. Black silk lined with crimson silk.	Gown. Black silk. Hood. Scarlet cloth lined with crimson silk.

B.D.

Gown. Black silk.
Hood. Black silk lined with glossy black silk.

D.D.

Gown. Black silk.
Hood. Scarlet cloth lined with black silk.

B.C.L.

Gown. Black silk.
Hood. Blue silk trimmed with white fur.

D.C.L.

Gown. Black silk.
Hood. Scarlet cloth lined with crimson silk.

Mus.B.

Gown. Black silk.
Hood. Blue silk trimmed with white fur.

Mus.D.

Gown. Black silk.
Hood. White silk in brocade lined with crimson silk.

S.C.L. and S.M.

Gown. Black stuff.
Hood. Blue silk.

D.Sc. and D.Litt.

Gown. Black silk.
Hood. Scarlet cloth lined with French gray.

Doctors of Divinity, Civil Law, Medicine, Music, Science, and Letters are entitled to wear a scarlet cloth gown, faced and lined with the color of the lining of the hood of their respective faculties.

UNIVERSITY OF CAMBRIDGE

B.A.

Gown. Black stuff.
Hood. Black stuff trimmed with white fur.

M.A.

Gown. Black silk.
Hood. Black silk lined with white silk.

B.D.

Gown. Black silk.
Hood. Black silk lined with black silk.

D.D.

Gown. Black silk.
Hood. Scarlet cloth lined with pink silk.

LL.B.

Gown. Black silk.
Hood. Black silk trimmed with white fur.

LL.M.

Gown. Black silk.
Hood. Black silk lined with white fur.

LL.D.

Gown. Black silk.
Hood. Scarlet cloth lined with pink silk.

M.B.

Gown. Black silk.
Hood. Black silk trimmed with white fur.

M.D.

Gown. Black silk.
Hood. Scarlet cloth lined with pink silk.

Mus.B.

Gown. Black silk.
Hood. Black stuff trimmed with white fur.

Mus.D.

Gown. Black silk.
Hood. Red puce silk lined with white silk.

Doctors of Divinity, Laws, Medicine, and Music are entitled to wear scarlet gowns, faced and lined with the color of the lining of the hood of their respective faculties.

UNIVERSITY OF EDINBURGH

M.A.

Gown. Black silk.
Hood. Black silk lined with white silk.

B.D.

Gown. Black silk.
Hood. Black silk lined with purple silk, bordered with fur.

D.D.

Gown. Black silk.
Hood. Black cloth lined with purple silk.

LL.B.

Gown. Black silk.
Hood. Black silk lined with blue silk, edged with white fur.

LL.D.

Gown. Black silk.
Hood. Black cloth lined with blue silk.

M.B. and M.S.

Gown. Black silk.
Hood. Black silk lined with crimson silk, edged with white fur.

M.D.

Gown. Black silk.
Hood. Black cloth lined with crimson silk.

B.Sc.

Gown. Black silk.
Hood. Black silk lined with lemon-yellow silk, edged with white fur.

D.Sc.

Gown. Black silk.
Hood. Black silk lined with lemon-yellow silk.

Full-dress gowns for Doctors of the University of Edinburgh are made of superfine scarlet cloth, loose sleeves, lined with rich silk of the color of the lining of the hood of the graduate's degree.

The following is the Intercollegiate System in use in the United States.

GOWNS

UNDERGRADUATE: Of black stuff, round or pointed sleeve, open or closed, no hood.

BACHELORS: Of black stuff, long pointed sleeve, open or closed, with hood.

MASTERS: Of silk preferably, long closed sleeve, with slit near upper part for arm, open, with hood.

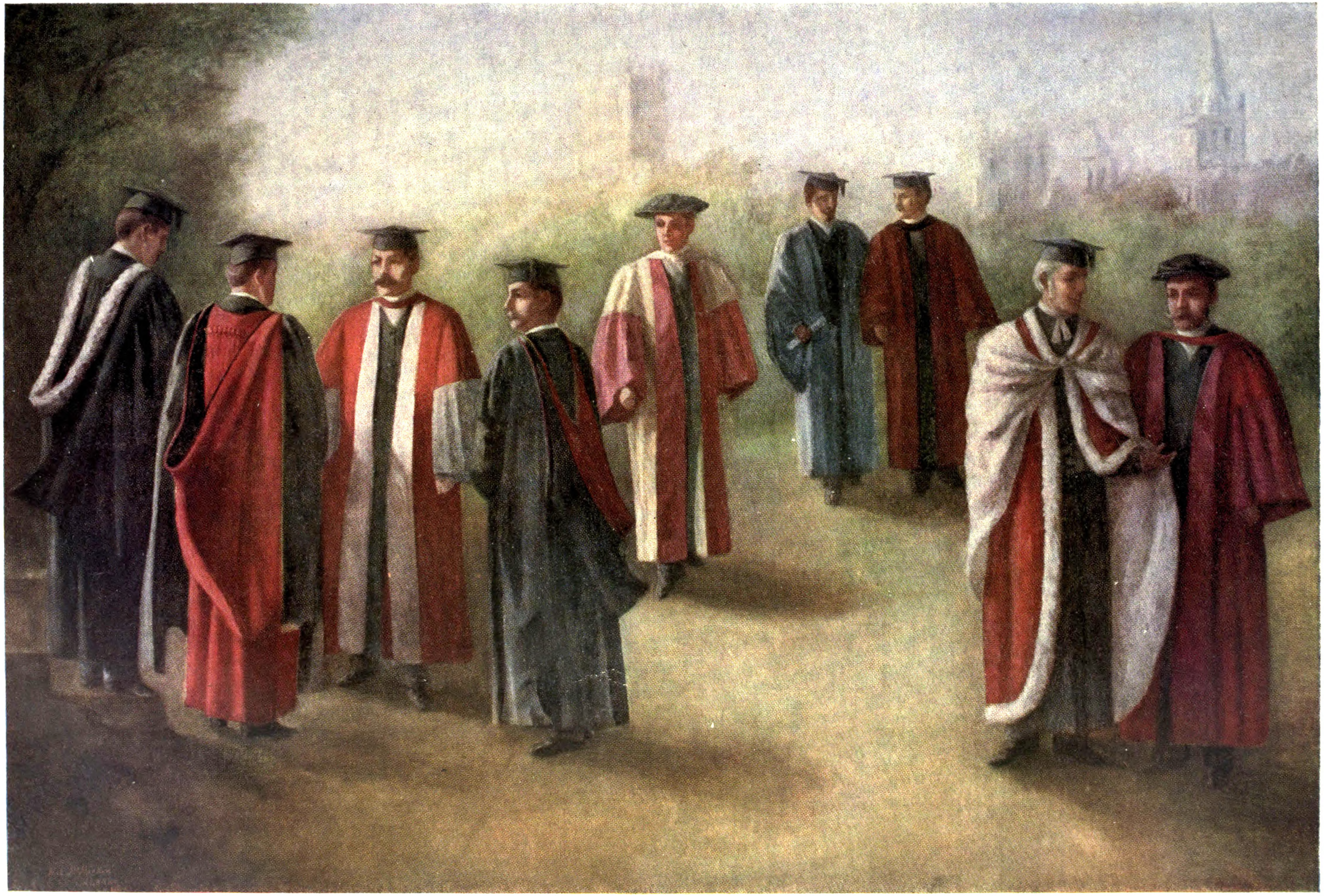
DOCTORS: Of silk preferably, with round bell sleeve; gown faced down the fronts and barred on the sleeves with black velvet or velvet wholly or in part of the degree color, with hood.

Presidents, Chancellors, and Deans may have the yokes, fronts, and bars trimmed with gold braid and may wear gold tassels. Members of the Governing Body (Trustees, etc.) may wear the Doctor's gown during tenure of office.

HOODS

Hoods should be of the same materials as the Gowns, are of distinctive shapes for Bachelor, Master, and Doctor, and are lined with silk showing the official colors of the institution conferring the degree, or with which the wearer is connected, and are trimmed with velvet of the color distinctive of the degree, thus: —

Arts and letters	white	Oratory . . .	silver-gray
Theology . .	scarlet	Engineering . .	orange
Laws . . .	purple	Pharmacy . .	olive
Philosophy .	blue	Dentistry . . .	lilac
Science . .	gold-yellow	Veterinary science	gray
Fine arts . .	brown	Forestry . . .	russet
Medicine . .	green	Library science .	lemon
Music . . .	pink	Pedagogy . . .	light blue
Commerce and Accountancy . . .	drab		



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BRITISH USAGE IN ACADEMIC COSTUME

B.A., Oxford
D.D., Oxford (Convocation Robe).
Sc.D., Oxford (Full Dress).
M.A., Oxford.
Mus.D., Oxford.
Pensioner of Trinity College, Cambridge.
D.D., Edinburgh (Full Dress).
Vice-Chancellor, Cambridge.
D.C.L., Oxford. (Full Dress).

CAPS

The Oxford cap, of serge or broadcloth, with either stiff or folding crown, is worn for all degrees, but the Doctorate is entitled to a gold tassel in whole or part, and the Doctor's cap may be of velvet.

The official colors of some of the more important institutions are as follows: —

Yale	Blue
Harvard	Crimson
Columbia	Light blue, with white chevron
Princeton	Orange, with black chevron
Univ. of Penn.	Red, with blue chevron
Williams	Royal purple
Bryn Mawr	Maize, with white chevron
Cornell	Carnelian, with two white chevrons
University of Chicago	Maroon
Union	Garnet
Hamilton	Blue, with buff chevron
New York University	Violet
Johns Hopkins	Black, with gold chevron
Syracuse	Orange
Tulane	Olive, with blue chevron
Dartmouth	Green
Wellesley	Dark blue
Brown	Brown
Mt. Holyoke	Light blue
Amherst	Purple, with white chevron
Wesleyan	Cardinal, with black chevron
Tufts	Brown, with blue chevron
George Washington University	Blue, with buff chevron
Lehigh	Brown, with white chevron
Georgetown	Gray, with blue chevron
Holy Cross	Purple
St. Francis Xavier	Maroon, with blue chevron
Manhattan	White, with green chevron
University of Michigan	Maize, with blue chevron
University of California	Gold silk, with blue chevron
St. Stephens	Cardinal
Rutgers	Scarlet

Foreign Colleges

Protestant College, Beirut, Syria	Turkey red and white
Robert College, Constantinople	Light blue
Manila University	Gold and light blue

Naturally college colors are better known in their bounds than outside, and better at institutions that play match games together than at more distant places. American college colors are, however, being carried everywhere, especially since it has become the custom for universities and colleges to give to the recipients of their honorary degrees the correct hoods for these degrees. At centennials and other great convocations many are given to visiting delegates from American and foreign universities, and are carried and later worn in widely separated places, and thus serve to make known the institutions whose degrees are represented by the hoods.

As there are a large number of professors in America holding German degrees, in faculties where the intercollegiate system is used, it has become the custom for them to use the caps, gowns, and hoods of their appropriate degrees, which are usually Ph.D., lining the hoods with the colors of the German universities, upon which is laid a German tri-chevron of black, white, and red. This custom was inaugurated in 1895 at the University of Chicago by a conference of professors of German and other nationalities who were outfitting under the American system, and who designed this symbolism to indicate the source of the degrees which represented so much of German modern research.

The German universities are represented as follows: —

University of Berlin	Purple, with tri-chevron in center
University of Freiburg	Dark green, with tri-chevron in center
University of Göttingen	Yellow, with tri-chevron in center
University of Halle	White, with tri-chevron in center
University of Heidelberg	Red, with tri-chevron in center
University of Munich	Light blue, with tri-chevron in center
University of Leipsic	Green above white, with tri-chevron in center
University of Jena	Green above gold, with tri-chevron in center
University of Würzburg	Blue above white, with tri-chevron in center
University of Tübingen	Red above black, with tri-chevron in center
University of Bonn	White above black, with tri-chevron in center
University of Strassburg	Black above red, with white chevron
University of Breslau	Black above white, with red chevron
Royal Normal College, Munich	Blue and white panels, with tri-chevron

Harvard has the same code for gowns, but shows the school in which the degree was given by the same colors as the trimming of the hoods under the intercollegiate system, in the form of braided double crow's-feet (for honorary degrees, triple crow's-feet) placed on each side of the gown in front near the collar. Harvard hoods are all of the Master's shape, lined with crimson, and are of different lengths for Bachelors, Masters, and Doctors. For honorary degrees they are of cloth, otherwise they match the gowns. Professors, assistant professors, and other members of the University Council wear a square soft cap of velvet.

The following colleges retain empirical codes in use before the framing of the intercollegiate system: Trinity, University of the South (Sewanee), St. John's (Annapolis). They are to be found in the Living Church Almanac.

Caps and gowns have been used in the United States from colonial times, particularly at Columbia (King's College), where a local code existed. New York University, University of Pennsylvania, and others have used gowns for long periods. About 1885 there came a student movement to use them, and from then until 1893 there was a rapidly increasing adoption of the custom on the part of graduating classes due to an appreciation of their value, largely from a democratic standpoint, since gowns and caps clothed all alike in an outward, equal fellowship. An interest also arose among college presidents and trustees, and the Yale Corporation was one of the earliest governing bodies to be gowned. The Columbia, New York University, and University of Pennsylvania faculties were already gowned. The Harvard faculty was supplied for the 250th anniversary in 1886.

The statute for an Intercollegiate System of Academic Costume was drawn by a commission proposed by Princeton in 1893, to which the leading universities and colleges were invited to send members. Columbia was represented by President Seth Low and Bishop Potter, a trustee; Yale by Rev. Chas. Ray Palmer, a trustee; University of New York by Chancellor McCracken, and Princeton by Col. John J. McCook, a trustee who was the moving spirit at Princeton in proposing the commission, and the secretary of the commission when organized. A number of institutions expressed interest without sending delegates. Col. McCook had seen the value of devices on army uniforms in differentiating the various army corps and divisions. He studied the traditional colors as used in the older universities of Italy, France, and Great Britain to mark the different faculties; he realized the endless confusion that would arise should each American college have its own unrelated code of gowns, and especially of hoods, and knew that American colleges would never be able to secure the benefits of academic costume unless a system could be devised that could be adapted to all institutions and be understood in all by any one who had become familiar with the system at any one institution. The writer, whose article in the *University Magazine* of Dec., 1893, had pointed out the need of a system, was called into consultation, prepared colored sketches and experimental gowns and hoods, and assisted in defining the distinguishing features of the caps, gowns, and hoods for the different degrees.

The statute as prepared by the commission was offered to the universities and colleges, and was soon adopted by a considerable number, and has since been taken up so generally that it is considered to be in force at all institutions in the United States, with the few exceptions noted. In 1894, when the statute was adopted, a registry under the name of the Intercollegiate Bureau of Academic Costume was opened to record the correct colors of the institutions, the arrangement of the colors where more than one was employed, and any other particulars of the gowns, hoods, and caps used under the system or otherwise of all colleges and universities wherever located, and any other information as to their ceremonies. In 1902 the Regents of the University of the State of New York granted a charter to the Bureau which had really been in existence since 1887, and it has continued its location at Albany, N.Y.

The object of the corporation is "to establish and maintain a library relating to the universities, professional, technical, and advanced schools and colleges of the world, particularly as to their membership and their ceremonial and other public appearances, including their gowns, hoods, caps, robes, badges, banners, arms, and other regalia used on such occasions; to maintain a register of statutes, codes, and usages, designs and descriptions of the articles of academic costume and regalia with their correct colors, materials, qualities, sizes, proportions, and the arrangement thereof; to promote social intercourse among members of universities and colleges, and to disseminate information on the subjects above mentioned."

The opinion of the bureau is to be had by any one interested, without charge, as it was founded through an academic interest to fill a need of the colleges and universities in collating information and securing correctness in the use of academic costume — the regalia of the educational army. G. C. L.

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ACADEMIC FREEDOM. — See Freedom of Teaching or Academic Freedom (for Freedom of Learning, see Elective System).

ACADEMICIAN. — See Educational Journalism in America.

ACADÉMIE (English, academy). — The largest unit in the administrative organization of the French educational system. The ninety departments into which France is divided are grouped in a more or less arbitrary fashion into seventeen academies. These are: Aix, Besançon, Bordeaux, Caen, Chambéry, Clermont, Dijon, Grenoble, Lille, Lyons, Montpellier, Nancy, Paris, Poitiers, Rennes, Toulouse, and Algier, each one taking its name from the city which is its official seat, and each except Chambéry and Algier having its own university. The administrative officer of the academy is the rector, who is at the head of all three degrees of instruction, elementary, secondary, and higher. (The Minister of Public Instruction is the rector of the Academy of Paris, but his active functions, as far as this particular academy is concerned, are delegated to a vice-rector.) Under the rector are as many academy inspectors as there are departments in the academy, although Paris has several additional inspectors. These academies vary greatly in size and importance, ranging from Paris, with nine departments and approximately five and three quarters millions of people, to Chambéry, with only two departments and fewer than seventy-eight thousand inhabitants.

See FRANCE, EDUCATION IN.

ACADEMY. — A term derived from the Greek ἀκαδήμεια, a suburb of Athens, which was laid out by Cimon and presented to the city as public pleasure grounds. It was here that Plato met and discussed with his pupils, and here his followers established themselves as a school. Hence the name "Academy" came to be applied to them, and from this use was adopted generally to refer to any school or place of learning or any association of men formed for the pursuit of literary or scientific or artistic investigation. The library and university of Alexandria are said to have originated from such an institution, founded by Ptolemy Soter. And Charlemagne and Alcuin are credited with the establishment of an academy for the study of grammar, rhetoric, poetry, history, and mathematics. But it was during the Renaissance that the academy in the sense of an association of literary men sprang into popularity with the educated classes, particularly with the aristocracy, who here found an outlet for their activity. Although the academy may have originated earlier or in another country (Belgium is said to have had an academy in the twelfth century), Italy is the scene of its fuller development; and only one other institution, the *Academy of Floral Games*, founded at Toulouse in 1325 to award prizes to successful Troubadours, has had a longer and more successful career, continuing in existence to the present time for the encouragement of poetry. The earliest academies were founded for the advancement of the study, first of classical, and soon afterwards of Italian, literature. The *Platonic Academy* was founded at Florence in 1474 under the patronage of Cosmo de' Medici for the study of philology and the philosophy of Plato, to which were soon added the works of Dante and other Italian writers. After the expulsion of the Medici and the dissolution of the academy in 1527, the work, particularly the study of Italian writers, was taken up by the *Academy of Florence*, 1540. Numerous associations were formed for the same purpose in all parts of Italy; the most famous being the *Accademia della Crusca* or *Furfuratorum*, the "academy of the sifted ones," formed in 1587. This academy published in 1613 the *Vocabulario della Crusca*. Incorporated with two other societies it is still in existence. Academies of a similar character soon came to be established throughout Europe. In 1617 *Die Fruchtbringende Gesellschaft* was founded at Weimar to foster a study of the German language and rhetoric and to set the standards for a distinctively German education and morality. Its influence, however, was never strong. The further development of the literary academy took place in France under the patronage of Louis XIV and his ministers. The *French Academy* originated from a private society formed for the study of French literature. It received its charter from the King, on the recommendation of Richelieu, in 1635. Its aim was "to regulate the language and render it pure, eloquent, and capable of treating the arts and sciences." Its most important work was the issue of the Dictionary in 1639, which has been constantly supplemented. With this Academy all French literary men have been connected. Upon the merits of a body which attempts to act as a High Court of Letters it is not necessary to enter here. During the Revolution the French Academy, along with other existing academies, was incorporated in the Institute. An academy of this type was never formed in England. Arising out of the study of literature, academies for the study of archæology and history arose. In 1701, under the patronage of the King, the *Royal Academy of Inscriptions and Medals* was formed, primarily for the purpose of suggesting suitable designs and memorials to commemorate the work of Louis XIV, and secondarily for the study and discussion of the subject generally. In 1755 the *Academy of Herculaneum* was established at Naples for the study and discussion of antiquities. This academy published an account of its work in 1775 in the *Antichità di Ercolano*.

But it was in the field of science that the academy had its greatest and most universal success. The universities in the seventeenth and eighteenth century did not look with favor on the study of science, and except in a few German universities no encouragement was given to it. The Academy afforded an excellent organization for those whose interests were strongly scientific. It is a matter of note that the best work in science has been done outside the universities and largely through the encouragement of the academies. The earliest scientific academy was founded in 1560 at Naples — the *Academia Secretorum Naturae* — the membership in which was open only to those who had made some discovery in medicine or philosophy. Incurring the suspicions of the Church, this academy was speedily dissolved. An academy with similar aim was formed at Rome under the influence of Federigo Cesi, bearing the name *Lincei*, or the lynxes. The *Accademia del Cimento* at Florence (1657–1667) was a society founded for the purpose of conducting experiments. Of this academy Torricelli, the inventor of the barometer, was a member. In France the *Old Academy of Sciences*, which began as a private society, was given a charter at the suggestion of Colbert in 1666. Sections were organized for the study of mathematics, physics, and chemistry; pensions were given to members by the King, and money was provided for instruments. Descartes and Pascal were members of this institution, and Sir Isaac Newton became a foreign associate, and after the academy was reconstituted in 1699 every French scientist of note was a member. After being abolished in 1792 the academy was revived and reconstituted in 1812. The earliest scientific academy in Germany was the *Collegium Curiosum*, founded by J. C. Sturm in 1672, professor at Altorff, for the repetition and discussion of experiments. At the suggestion of Leibnitz, Frederick I established the *Royal Academy of Science* at Berlin in 1700. It was reconstituted in 1812 with four sections, physical, mathematical, philosophical, and historical. The regular members are paid. Among its members the academy has included the two Humboldts, Savigny, Schleiermacher and Ranke. Under the influence of the prevailing tendency a few followers of Bacon met together in 1645 for the discussion of experimental society. Out of these meetings arose the *Royal Society* (*q.v.*), which received its charter in 1662. Two other developments of the academy have been for the study of medicine and surgery (*Naturae Curiosi* or *Leopoldine Academy* in Germany, f. 1662, *Academy of Surgery* in Vienna, and the *Royal Academy of Medicine* in France are the most important) and the fine arts (the *Royal Academy of Arts* in England, f. 1768, and the *Academy of Painting and Sculpture* in Paris, f. 1648, are conspicuous examples).

This type of academy has developed in the United States, beginning with the *American Philosophical Society*, of which Benjamin Franklin was the originator in 1743. In 1780 the *American Academy of Arts and Sciences* came into being for the study of American antiquities and natural history. In 1812 was founded the *Philadelphia Academy of Natural Science*, which soon developed a library and museum of considerable value, particularly in the fields of ornithology and conchology. In 1863 the *National Academy of Science* was chartered by Congress as an official organ for scientific investigation. In 1898 the *Washington Academy of Science* was formed by the incorporation of several societies working in Washington. A further development is the *American Academy of Political and Social Science*, founded in 1889 in Philadelphia. Local academies also exist for the encouragement of fine arts.

Courtly Academies. — In the middle of the sixteenth century arose, under the influence of treatises like *Il Cortegiano* of Castiglione (*q.v.*) the advocacy of a type of school where the sons of noblemen and landed gentry could obtain the courtly training which the public schools of the day did not offer. These schools were known as *Academies*. In the curriculum were included exercises in arms and gymnastics, Latin, modern languages, practical mathematics, and natural philosophy. Such a type of education is sketched by Sir Humphrey Gilbert in *Queen Elizabeth's Academy*, 1572, setting forth a project for the education of the wards of the court and " others of the youth of nobility and gentlemen." A conspicuous feature in the book is the emphasis which is laid on the training in English. The entire aim of this type of education may be summed up in Gilbert's own language, " For such as govern commonweals ought rather to bend themselves to the practice thereof than to be tied to the bookish circumstances of the same." The practical end was therefore uppermost in the training of the academies. Several other works of the same kind appeared in the sixteenth and seventeenth centuries. The result of the tendency was seen in the rise of academies at this time. In Germany there was a widespread development of them under the title of *Ritterakademien*. In France they were encouraged by Richelieu, under whose patronage the Academy of Tours was established, where the pupils were taught physical science, mathematics, geography, French, Italian, Spanish, history, heraldry, and martial accomplishments. At Tuilly there was a similar academy under royal patronage. In England the strongest advocate of this type of education was Milton (*q.v.*), who in the *Tractate of Education* (1644) fully develops the aims and ideals represented by the academy. The *Tractate* is all the more valuable as it was based on Milton's practical experience, for a short time, at any rate, in keeping an academy. In 1640 a proposal was made in the House of Lords " about the erecting of an Academy, for the breeding and training up of young noblemen and gentlemen." The attempt to introduce academies into England did not succeed. The experiments of Sir Balthazar Gerbier (1649) and of Faubert (1682) in London were short-lived. The academies as developed in France and Germany performed an important function in modernizing the curriculum of the secondary school. In England the suggestion contained in Milton's *Tractate* appears in a modified form to have been taken up in the academies of the dissenters, which arose as a result of the religious intolerance of the period. (See GENTRY, EDUCATION OF.)

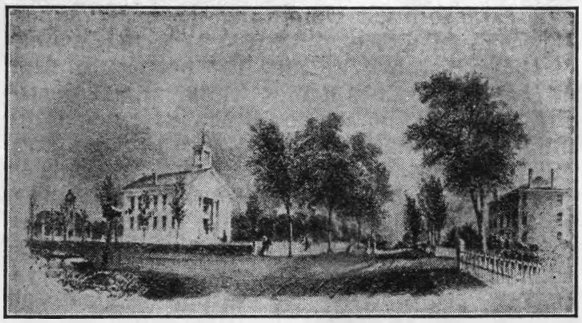
Nonconformist Academies. — By the Act of Uniformity (1662) not only were dissenters excluded from university privileges, but those who by that time had already completed their university education were debarred from teaching by the necessity of obtaining a bishop's license. The result was that those who did attempt to teach did so by stealth or were compelled to move about by the relentlessness of their persecutors. It was in the north of England particularly that the need of higher education was most felt. Cromwell had attempted to meet the demand by establishing the University of Durham (*q.v.*) in 1657, but the patent was withdrawn at the Restoration. Of the two thousand nonconformist ministers, who were dispossessed by the Act of Uniformity, many were driven by necessity, some by choice, others by the need of training up successors to the nonconformist ministry, to set up academies. At first many found it difficult to reconcile it to their consciences to give higher instruction, for they felt restrained by the graduation oath of Oxford or Cambridge from imparting instruction of university rank. Ultimately the argument that the oath only applied to institutions which granted degrees prevailed, and the dissenting academies arose in different parts of the country, but more particularly in Lancashire and Yorkshire. The choice of the title "academy" for these institutions may be traced back either to Milton's use, or better to the application of the term by Calvin and the founders of the University of Edinburgh to universities which were established without the sanction of the Pope. Generally these academies were taught by one man, later two or three assistant tutors were engaged. The pupils boarded in the house of the tutor, and often threw in their lot with him, when, owing to the ever-impending danger of prosecution, he found it necessary to move from one town to another. Frequently the tutors continued as dissenting ministers, and the necessity of accepting calls involved the removal of the academy. The students were not drawn alone from among the dissenters, for the academies were set up as a protest against the religious intolerance of the universities and as a demand that seats of learning should be open to all. Thus Harley, Earl of Oxford, who later introduced the Schism Bill, was educated in an academy; so too were Thomas Secker, later Archbishop of Canterbury, and Butler, later Bishop of Durham and author of the *Analogy*. At first the class of students who were drawn to the academies were in a position to maintain themselves; later, however, they were drawn from a poorer class, and funds for their support were established. The Independents of London had two such funds under the charge of the Independent Fund Board and the King's Head Society. Many depended on and received private munificence and bequests. In addition to classics and Hebrew, lectures were given at the academies on theology, logic, ethics, natural philosophy, somatology, pneumatology, and chronology. Latin was the language of instruction and conversation, with only slight exceptions, until the change to English was introduced by Doddridge. The students did not receive a preparation for the ministry alone, but for medicine and public life. The standard which was attained in the usual course of four years may be judged from the fact that on leaving the academies students were permitted to graduate at one of the Scottish universities after one session.

The earliest academy was established by Richard Frankland in his house at Rathmell, Yorkshire, in 1670. Frankland, who was a graduate of Cambridge and was selected for an appointment at Durham University, was a man of strong personality, and had had the courage to beard Charles II on the religious question. In spite of numerous vicissitudes, he succeeded in keeping his academy together for twenty-eight years. His successor was Timothy Jollie, who removed to Attercliffe in Yorkshire. A large number of other academies soon followed in an unbroken series. Bogue and Bennett (*History of Dissenters*, London, 1808–1812) enumerate thirty-five academies from Frankland's foundation to 1780. Perhaps the teacher who had the widest influence, particularly through his textbooks, was Philip Doddridge (*q.v.*), who had charge of the academy at Northampton for twenty-two years and introduced the practice of lecturing in English. With Doddridge the persecution of the dissenting teachers came to an end, through the intervention of George III on his behalf, when an attempt was made to bring him to trial. Doddridge's academy was moved by his successor to Daventry, where Joseph Priestley, who later himself taught in the academy at Warrington, was a student. Toward the end of the eighteenth century the activity of the nonconformist academies came to an end, with the exception of the Manchester Academy, founded 1699 and later removed to London and now located at Oxford as Manchester College.

The service of the nonconformist academies to English education cannot be overrated. At a time when a large number of eager students would have been excluded from the universities they stepped in and very adequately filled the breach. By their attention to subjects which were beyond the scope of the universities, they contributed in assisting the modern branches of learning to obtain a foothold in England. Without the strong conservatism and devotion to forms of the older universities, the academies were eminently progressive and adaptable to new needs. Since there was not any restriction as to the length of the courses, students were in a position to go from one academy to another in search of what suited them best. The earnestness of the teachers who were not secure in a lifelong university appointment could not but fire the enthusiasm of their students. On their services to nonconformity and the principle of toleration this is not the place to enlarge. (See DISSENTERS AND EDUCATION.)

In America. — Secondary education in America has appeared, successively, under three dominant type forms, the (Latin) grammar school of the colonial period, the academy of the early republic, and the public high school, since the Civil War. The colonial grammar school was a close reproduction of its English prototype. It tended, especially in New England, to be local in its patronage. Its prime function was to fit boys for the university. Its curriculum, accordingly, consisted (properly) of only Latin and Greek. In theory, Latin was the exclusive language, not only of the schoolroom, but also of the playground. When the exigencies of practical life did force the grammar school to provide English, writing, and arithmetic, such studies were looked upon as extraneous, introduced merely " in order to qualify such for business as intended to make no further progress in learning." Moreover, for the most part, the grammar school had grown up within some dominant religious establishment which it in turn tended to perpetuate. This was as true of the Episcopal aristocracy of Maryland, Virginia, and South Carolina as it was of the Puritan hierarchy of New England.

As the eighteenth century progressed, this unity of original control was shaken. Whitefield and the "New Lights" stirred the intrenched religious conservatism from Georgia to Massachusetts. A host of Presbyterian Scotch and Irish entered into the Middle and Southern colonies. Baptists increased in numbers, and Methodism began to be felt. The day of the nonconformist was at hand. At the same time there was rising everywhere an American spirit which began to be conscious of itself and desirous of settling American problems in an American way. New institutions were demanded. It has been shown in the preceding section how that after the Restoration the academy arose in England to meet, in an individual fashion, the nonconformist need of education. Probably the American academy is not so much a direct transplanting of the English institution as it is a spontaneous outgrowth from somewhat analogous circumstances. The old grammar school had been exclusive in aim and curriculum; the university was its *raison d'être*. The new institution must be democratic, answering to a majority who are not to go to college. Moreover, it must furnish a training more evidently suited to the demands of a new country. Latin had ceased to be the language of practical learning; the Americans recognized the fact. Science as an agency of civilization was beginning to be felt, at least in possibility. An ever-extending frontier demanded a school that could care for pupils from remote distances. Flexibility to meet widely varying local needs was an essential requisite. In this situation the academy arose.



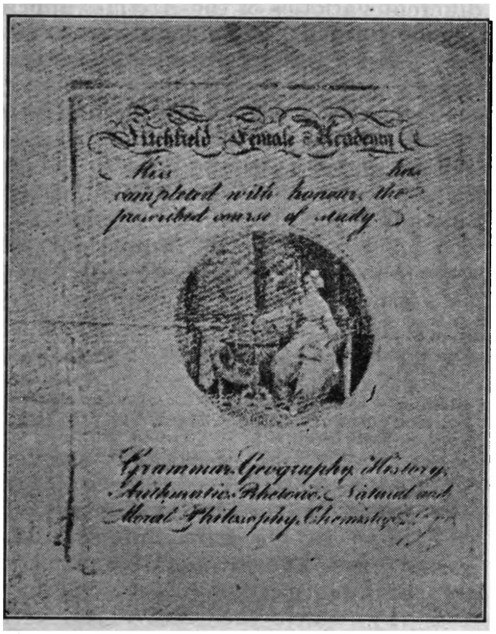
An Early New England Academy.

To state where in America the academy originated is not easy. Many considerations deny that credit to the free school or " academy " of " Charlestown " (S.C.) in 1712, although no earlier application of the term to a secondary school has been pointed out, and provision was there made for " navigation and surveying and other useful and practical parts of the mathematics." Nor can the credit be given to Tennent's " Log College " in New Jersey (1726), which Whitefield in 1739 called an " academy," although this was the parent of the " log college " movement among the Presbyterians; and the " log college " did in many respects belong to the academy type. To Franklin's Philadelphia academy (proposed 1743, established 1751) no exception can be taken. (See PENNSYLVANIA, UNIVERSITY OF.) Type and name unite, apparently for the first time in America. By general consent this has been taken as the first clear case of the American academy. As the Revolution drew near, the Presbyterians and other nonconformists established, especially in the middle and southern colonies, secondary schools which they frequently called academies. Kingston, N.Y., and Newark, N.J., provided " academies " in 1773 and 1775 respectively. By 1790 the new type of school was definitely established in all parts of the nation. Among specific institutions, the Phillips academies at Andover (1780) and Exeter (1781) and Erasmus Hall (1787) at Flatbush, L.I., deserve especial notice for their far-reaching influence.

While the academies are primarily institutions of semi-private or local origin, most of the states assisted in their founding and support. Several states provided systems. Georgia and New York furnish the most interesting early legislation, each in turn curiously anticipating the other. Georgia's constitution of 1777 called for " schools " in each county, " supported at the general expense of the state." In 1783 her legislature provided by land endowment for a system of county academies, and on Feb. 25, 1784, similarly endowed a university. New York, on May 1, 1784, chartered a university and provided for " schools and colleges " to be parts of the university (the grade of the schools not being specified). Georgia amended her university charter in 1785, requiring that " all public schools . . . shall be considered as parts or members of the university." The university should " prescribe what branches . . . be taught . . . in each "; and should " also examine and recommend the instructors to be employed in them." In 1787 New York amended her 1784 act so as to authorize and require the regents " to visit and inspect all the colleges, academies, and schools which are or may be established in this state." In 1813 New York established a " Literature Fund," the income of which went to the support of academies. In 1821 Georgia established a similar " academic fund " of $250,000. But by

1840 Georgia had abandoned support and control of her academies in favor of elementary education, while at the same time New York began to increase both her support and control.

Many other states adopted one or more of the features above described. Massachusetts in 1797 sets out a policy of land endowments of properly located academies. The next year Kentucky does the same for a county system. Later Maryland, Louisiana, Tennessee, and Indiana adopt the county system. To speak generally, the states subsidized the academies by one plan or another, leaving them, for the most part, to self-perpetuating boards or other forms of local control. Tuition charges were almost invariable. By the middle of the nineteenth century, when the movement began its decline, the academies were very numerous throughout the Union, forming in many localities the only very definitely organized schools, and admitting pupils of all grades.


Litchfield Female Academy
Miss has
completed with honour the
prescribed course of study
Grammar, Geography, History,
Arithmetic, Rhetoric, Natural and
Moral Philosophy, Chemistry

An Academy Diploma, giving the Curriculum.

The curriculum of the early academy has already been suggested. Latin still remained as the backbone of the course, though taught now in English and for professedly different reasons. Greek was frequent, if not usual. English grammar held an increasing place from the first. Arithmetic and geometry appeared generally, astronomy frequently. " Geography with the use of the globes " was quite the proper thing to advertise. Declamation was usual, as befitted a free country where oratory was much in demand. Quarterly oral examinations convinced patrons " of the merits of the institution and the literary attainments of the scholars."

The academy was more open to girls than had been the grammar school. In 1780 there was begun in Philadelphia an academy for girls, an example followed increasingly. The most famous of such, Mrs. Willard's seminary, founded in 1821 at Troy, N.Y., may properly be said to be the beginning of the higher education of women in America. Many academies were coeducational. In the earlier days, this was frequently effected by "female departments." Thus in an 1815 advertisement, "the three departments, classical, English, and female, will be furnished each with an instructor; besides which the Rector will divide his time and exertions among them."

One of the reasons urged by Franklin for the establishment of his academy was " that a number of the poorer sort will hereby be qualified to act as schoolmasters in the country." The argument might have been generalized for the whole country. The academy came to be the chief source of supply of elementary teachers, a fact many times recognized by general school authorities. In 1830 specific preparation of common school teachers was undertaken at Phillips Andover, while three years later " teachers' classes " were provided in many New York academies. When the state normal school (*q.v.*) came as a distinct institution, it was in fact but the academy transformed for this specific purpose.

The decline of the movement began toward the middle of the nineteenth century, earlier for the cities and urban regions, later for the rural communities. Many of the smaller academies had never been true secondary schools; such disappear amid improved common schools. The better endowed of the academies, especially those founded by individuals or by churches, remain to-day as important preparatory schools. Many academies that had been founded by state or local public authorities were changed into high schools, as in the " county seminary " system of Indiana and the county academies of Maryland. In the latter case the change is still in process.

Several reasons may be assigned for the general change from the academy to the public high school. There had grown up a much stronger feeling for the public control and support of popular education. Beginning with the common schools, the movement extended itself later to the field of secondary education. From this point of view the high school is the academy brought into the public school system. Again the academy, with the increase of wealth and the growth of higher education, had become in large measure a college preparatory school. From this point of view the high school is a recurrence to the democratic type which the academy had abandoned. To speak generally, the academy was the product of the frontier period of national development and the *laissez faire* theory of government. When these conditions departed, the academy gave place to the high school as the predominant secondary school of the American people.

E. E. B., I. L. K., AND W. H. K.

See Art Schools and Art Instruction in Europe; Colonial Period in American Education; Renaissance, Education during the; Calvinism and Education.

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ACADIA UNIVERSITY, WOLFVILLE, N.S. — Founded by the Nova Scotia Baptist Education Society, in 1838. Charter of incorporation obtained in 1839; given powers of a university in 1840; adopted name Acadia College in 1841. A revised charter was obtained in 1891 (an Act respecting Acadia University). The Board of Governors must report annually to the Baptist Convention of the Maritime Provinces, which appoints the governors. Admission to the university is by examination or certificate from an approved high school. Two courses are offered, leading to the B.A. and the B.S. Graduates in the scientific course are admitted to the third-year course of Applied Science at McGill University. The Acadia Seminary for young ladies and the Horton Academy, which is a preparatory institution, are under the control of the Board of Governors. The total annual income is about $20,000; the value of the productive endowment is $240,000. There are ten professors and four instructors. The average salary of professors is $1300 a year. Rev. W. B. Hutchinson, D.D., is the president.

ACCESSORY MUSCLES. — See Fundamental and Accessory.

ACCESSORY SUBJECTS. — A name sometimes applied to the more recent acquisitions to the curriculum, particularly those which demand objective and active treatment. Drawing, music, nature study, agriculture, etc., would be included under this term.

See Curriculum, Theory of; Values, Educational.

ACCIDENTS IN THE SCHOOL. — See Injured, First Aid to.

ACCIPIES. — A term applied to a woodcut which was frequently used on the title-page of schoolbooks printed about 1500 and bearing the words *Accipies tanti doctoris dogmata sancti* (thou wilt receive the theories of a great and revered scholar). The practice of using as title-page woodcuts representing as nearly as possible the characteristics of the author and the nature of the contents of a book was originated in the Netherlands about the middle of the fifteenth century. But the first actual use of the *Accipies* woodcut was made by Heinrich Quentell, a Cologne publisher, in a book issued in 1490. This title-page appears on all of his books printed up to 1496, and again in 1500. The picture at once became popular, and was widely imitated by other publishers, and in some cases was directly reproduced, either because it was difficult to obtain the services of artists locally, or because of the reputation enjoyed by the original. At least five different varieties of the *Accipies* appeared from 1495 up to the beginning of the sixteenth century. The varieties are of importance, as they afford a clue to the printer.

The illustration given on page 391 is an *accipies* cut of 1500 with the legend omitted. The dove, usually represented as whispering into the ear of the teacher, is a symbol of the Holy Ghost. From the fact that Quentell used such a cut as a title-page to books on Thomas Aquinas, it seems probable that he is here represented as the *tantus doctor*.

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ACCOMMODATION. — Both the process and the result of the Adaptation (*q.v.*) of the individual to his surroundings, natural and social, are known as accommodation. Strictly speaking, accommodation marks the processes by which the individual assimilates and reproduces the existing environment with a minimum of reaction against it or of effort to change it, while adaptation includes also making over of the environment to meet the new demands on the part of the living individual. In this stricter sense accommodation is a form of Habituation (*q.v.*) or "getting used" to persons and things. It covers the whole field of the "unconscious influence of the environment," and is, therefore, of primary importance to the educator, since during the early and plastic years children tend to take up in themselves and reflect all the characteristic features of their social surroundings. Its importance is greatest in the æsthetic field, in that of minor morals and manners and of habits of speech.

(*a*) Conscious or deliberate æsthetic culture is almost a contradiction in terms. Individuals may indeed seek out surroundings unusually rich in artistic material, may cultivate opportunities for æsthetic enjoyment, and may engage in practices which arouse susceptibility to beauty and refinement. But such æsthetic nurture as occurs takes place unconsciously and spontaneously as an accommodation of the individual organs to the beautiful environment.

(*b*) The same principle holds almost to the same extent in the territory of manners. Although conscious effort is relatively of greater importance than in æsthetic appreciation, the most effective means of securing a correct bearing, courteous demeanor, and observance of ordinary social conventionalities is contact with an environment in which models of the desired result abound and opposing influences are slight. While matters of right and wrong demand, at critical junctures, a larger measure of conscious reflection and choice, yet manners and morals blend insensibly into each other, and the warp, if not the woof, of character is constituted by original tendencies modified by habitual accommodations to social demands and relations.

(*c*) That habits of correct speech depend upon usage and wont formed through unconscious reproduction of good linguistic customs prevailing about one is a commonplace, but a commonplace which illustrates the potency of the principle of accommodation. Even educated persons are apt to betray in occasional lapses into uncouth modes of speech any deficiencies of their early environment.

Although the phrase " unconscious influence of the environment " gives an excellent popular rendering of the technical term "accommodation," we are not to infer that the organism is purely passive in the operations. Here as elsewhere the initiative lies with the organism in selecting certain congenial phases of the environment as stimuli to which to respond. (See Stimulus and Response).

Topics allied to Accommodation (aside from those mentioned in the text) are Environment, Imitation, Plasticity (*q.v.*). J. D.

ACCOMMODATION. — The process by which objects at different distances from the eye are focused sharply on the retina. In the higher animals this is brought about by an increase in the convexity of the lens for nearer objects and by a decrease in the convexity for farther objects. The nearest point for which one can accommodate lies about 12 cm. from the eye (roughly determined by moving fine print toward the eye until it becomes blurred); the far point for the normal human eye is theoretically infinity.

R. P. A.

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ACCOUNTANCY EDUCATION. — Although the science and practice of accountancy (including bookkeeping) is itself very old, dating back even to the Assyrians and Babylonians, systematic instruction in it is of extremely recent origin. Even now the school of practical experience, which served for so many centuries, is almost the only one in many countries. Even in the most progressive countries, where the profession of accountancy has the official or semi-official recognition of the governments, a large proportion of the instruction consists in coaching for the examinations which are held from time to time as a basis for the certification of practitioners.

The first instruction in bookkeeping of which there is record was in Italy in the early part of the sixteenth century. The art of bookkeeping had at that time been pretty fully developed in that country, and the first treatise on the subject had been published by Luca Paciolo in 1494 at Venice. This treatise (*De computis et scripturis*) comprised thirty-six chapters in a larger work summarizing the existing knowledge of mathematics. It served as a basis for other Italian treatises. Private schools sprang up to give individual instruction in bookkeeping. Other countries were also much indebted to Paciolo for their first treatises on bookkeeping, and the instruction in these was also in small private schools. By the latter part of the sixteenth century the knowledge of bookkeeping had spread to all the important countries. Since that time great improvement has been made in the science of bookkeeping and of accounts, but the methods of teaching have remained almost unchanged until comparatively recently. Apprenticeship to practitioners formed the bulk of the preparation, and was indeed regarded as the most indispensable part of it; the remainder was given in small private schools. This was still the condition of affairs in almost all countries at the middle of the nineteenth century.

In the United States at that time a few private business schools were in existence, with bookkeeping usually as the foundational study. Other branches of mathematics and penmanship usually composed the remainder of the curricula. One of the earliest schools, that of James Bennett of New York, taught bookkeeping and navigation. Until after 1880, private schools of this kind gave practically all the instruction in bookkeeping obtainable outside business offices. They had, of course, vastly increased in number and importance and in breadth and thoroughness of instruction. About this time the public high schools began to give courses in bookkeeping and other commercial subjects. There was still no systematic instruction in the more advanced science of accounts.

In 1887 an important step forward was taken, when the American Association of Public Accountants was incorporated under New York state laws. Under the auspices of this association a school of accounts was projected in 1892, but the attempt resulted in nothing. In 1896 an act " to regulate the profession of Public Accountancy " was passed by the New York state legislature and the degree of Certified Public Accountant was authorized to be given by the University of the State of New York. Similar legislation has since been undertaken by other states, and the movement is under way to have the profession legally recognized and regulated by every state in the Union. An important effect of this regulation has been in improving the form and the quality of education for the profession. The rigor of the requirements and the severity of the examinations in most states have made it necessary for the candidate to obtain better instruction than that afforded by his apprenticeship. A large amount of it is still obtained in private "coaching" schools (some of which are conducted by correspondence), but an increasing proportion is given in university and college schools of commerce. One of the first of these, the New York University School of Commerce, Accounts, and Finance, was established in 1900, largely through the efforts of the New York State Society of Certified Public Accountants, and its prime purpose was to give scientific preparation for the profession of public accountancy. It has since broadened its scope to include the general field of business, but instruction in accounting still forms the backbone of its curriculum. Attention is concentrated less on preparing students for Certified Public Accountants' examinations than on preparing them for successful practice of this and other business professions. Most of the sessions are held in the evening.

The New York University school is practically the only one in which accountancy education was of paramount importance in the original plan, but in most of the other university and college schools of commerce instruction in accounting subjects forms a very important part of the curriculum. There are over sixty of these schools in the country, among the most important of which are those in the state universities of Pennsylvania, Wisconsin, California, Illinois, and Iowa, Dartmouth College, the University of Chicago, Harvard University, the University of Denver, and Northwestern University. Of these the last two named are most like the New York University school in holding evening sessions and giving accountancy instruction an important place. Together with the great advance in accountancy education in these schools, there has been a very marked advance since 1900 in bookkeeping instruction in the public secondary schools and the private business schools. Much still remains to be done, but it may be said that accountancy education has had a good beginning in the United States, and now rests on a solid foundation. There is, in point of fact, practically no country in the world where accountancy education itself is on a better foundation.

In England recognition of the profession came much earlier, and instruction in it has therefore had a longer history. Many societies of accountants existed at the middle of the nineteenth century; in 1880 they were all incorporated into the Institute of Chartered Accountants in England and Wales. Steps were taken to protect the title of Chartered Accountant, and to this and other ends, the Society of Accountants and Auditors was formed in 1885. The original societies in the various cities preserved their original organization, but their alliance in the Institute helped to improve the system of examinations given. For these examinations private coaching schools still give the chief form of preparation. But some of the societies give assistance in the form of evening classes in accounting subjects. The articled clerks of Chartered Accountants have formed a number of students' societies for the advancement of their professional knowledge. At their meetings papers are read, examinations discussed, etc. But all this is very unsystematic. More encouraging is the recent establishment at the University of Birmingham and other universities of accounting courses on a par with the best in the world. Conditions in Scotland have been much the same as in England. There has generally been, however, more help given to apprentices in the way of evening classes. They have also been required to attend certain university law classes, in addition to serving their apprenticeship and passing their accountancy examinations.

Of continental countries, Italy is foremost in accountancy education. The profession of accountancy is well recognized, and a large number of societies exist. Membership in them is open to graduates of the accounting courses of the Royal Technical Institutes, of which there are more than sixty. The course of study in accounting extends over four years, and includes accounting and auditing, law, political economy, foreign languages, and a number of general branches. In Germany, commercial education in general is well developed, but as the profession of accountant has no official recognition, instruction in that branch has received comparatively little attention. In France, much the same state of affairs exists. Holland has a number of societies of accountants, and instruction in bookkeeping is well organized. In many of the South American Republics, notably Argentine, accountancy has been legally recognized for some time, and commercial schools prepare students for it. Japan gives a good character of instruction in bookkeeping in the higher schools of commerce. In other countries accountancy education is in an even less advanced stage, and is practically neglected. But as official recognition is more generally accorded, the profession will undoubtedly reach a higher level, and education for it will become more thorough and systematic everywhere.

J. F. J.

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ACCREDITED SCHOOLS. — After the organization of public high schools, and after they had begun to prepare their students for entrance into the colleges, the fitness of these students to enter was for some time uniformly tested by the college and by means of an entrance examination in such of the high-school subjects as the college saw fit to accept for entrance. Each college imposed not only its own entrance examination, but its own set of entrance requirements as well. High schools located in a region where colleges were numerous frequently had the difficult task imposed upon them of preparing students in four or five different sets of entrance subjects, to enable different students to enter as many different colleges. The preparation for one was of no necessity suitable for another. As long as the colleges were private institutions no serious objection to this method of procedure could be raised, but with the growth of the state universities as a part of the school system of the state the demand naturally arose that the transition from one part of the public school system to another part of the same system should be made less arbitrary, and that teachers in secondary schools should be permitted to concentrate more of their energy on good instruction and less upon cramming their pupils to meet the peculiarities or the idiosyncrasies of the college examiners.

One of the earliest as well as one of the most noteworthy attempts to meet this difficulty and to offer a reasonable solution of it was the introduction of an accrediting system by the University of Michigan in 1871. Under this system the university agreed to accept into its freshman class such graduates of previously approved high schools as were recommended to it by the principals of the schools as in their judgment properly prepared to do college work. This plan, with minor modifications, has been retained by Michigan ever since. From Michigan the plan, or some modification of it, has spread, and nearly all the state universities and many of the colleges of the United States have adopted some form of an accrediting system. Only a few of the older institutions still insist on students passing their own special examination tests; and a few more insist on this, or on the passing of those of an equivalent institution, or of the College Entrance Examination Board (*q.v.*). Nearly all such institutions are located east of the Alleghany Mountains.

The plan has been variously modified by different institutions and in different states. Usually a representative of the university, and sometimes a committee of the faculty, inspects the school on request, and inquires into its equipment, scope, the personnel of its teaching force, and the general tone and spirit. The school as a whole, rather than the individual teachers, is approved or disapproved. In Indiana the State Board of Education performs this function, and an accredited school is permitted to send any of its graduates to any state institution, where they must be received without examination. In California the school is inspected by a representative, and sometimes by a number of representatives, of the state university. It must have a reasonably good equipment in building, library, laboratory, and teachers; must provide a full four years' course of instruction; and must be doing good work. The school may be approved in whole or in part, and the part disapproved is only approved after subsequent inspection has shown that the work has been brought up to the required standard. In many states, within recent years, an official known as a high school inspector, usually attached to the Department of Education of the state university, though sometimes, as in Minnesota, attached to the office of the State Superintendent of Public Instruction, has been appointed to do the greater part of the work of inspection. Accrediting is usually made only for a limited period of years, and usually ceases, in certain subjects at least, when new and unexamined teachers are employed. The difficulty as well as the expense connected with an attempt on the part of each institution to inspect and accredit the high schools of any state or region has led, within recent years, to the formation of accrediting associations for the inspection and accrediting of the high schools of certain definite regions. The New England College Entrance Certificate Board is an example of this. An extension of the idea to the different areas of the United States would result not only in a simplification of the work, but a standardizing of the schools as well, and may be expected ultimately to take place.

In a few states, where the practice of examining the town and rural schools of the county for eighth-grade graduation prevails, County Boards of Education have begun to adopt a form of the accrediting system for elementary schools. The plan is in use in certain California counties, as well as in a few other states. The County Boards, after repeated inspection and examination of the schools of a town, and sometimes of particular rural schools, accredit the school and accept the recommendation of the principal, or teacher.

E. P. C.

See also Accredited Teachers; College Entrance Examinations; College Entrance

Boards; College Entrance Requirements; College and Secondary Schools, Relation of; High School Inspection.

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ACCREDITED TEACHERS. — The California system of accrediting both high and elementary schools is in part a system of accrediting teachers. In the high school inspection the work of certain able teachers becomes known and the inspection of their work is, after a time, made only once in two or three years. Sometimes an entire school is retained on the accredited list for two or three years at a time without an inspection, provided the same principal remains and the teaching force does not materially change. The same is true of the accrediting of elementary schools by the California County Boards of Education. Certain teachers are known to do good conscientious work and to recommend with care and discretion, and their schools are accredited so long as the school authorities retain them as teachers or principals of the schools. The effect of this is good on both the teachers and the school authorities. The plan of accrediting teachers is partially in use in a number of other states, and is a more or less conscious factor in the accrediting of high schools under the accrediting system. E. P. C.

See Accredited Schools.

ACCREDITING SYSTEM. — See Accredited Schools; High School, Accrediting of.

ACCURACY. — See Error.

ACHROMATIC QUALITIES. — Achromatic qualities in visual sensation, as distinguished from chromatic qualities (*q.v.*), are characterized by the absence of all specific color *tone* (*q.v.*), *hue* (*q.v.*), *tint* (*q.v.*), or *shade* (*q.v.*). They include therefore all the blacks, grays, and whites. Beginning with the deepest black, these qualities may be arranged progressively by just perceptible differences in sensation in a series through the various shades of gray to the most brilliant white. Throughout this progression the transitions are always like in kind — from a quality more similar to black to one just perceptibly more similar to white — and yet the two end qualities — black and white — show no similarity to each other except their absence of color. The series of achromatic qualities, or the black-white series, may thus be spatially represented by a straight line, one end representing black and the other white, with the various grays intervening. The movement from either end to the other is through a uniformly graded series of qualities. In the chromatic series, on the other hand, this uniformity of transition does not appear. There are sharp transitions. This series is usually, therefore, represented as a triangle, a square, or a circle (see Color Circle), the principal transition points occupying the corners, or, in the case of the circle, the extremities, of certain diameters. Achromatic qualities mixed always yield an achromatic quality, but mixtures of certain chromatic qualities may give an achromatic quality (see Complementary Color and Color Mixture). When an achromatic quality is mixed with a chromatic quality, it alters the saturation and usually the brightness of the chromatic quality. R. P. A.

See Saturation; Brightness; Intensity.

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ACKERMANN, WILHELM HEINRICH. — (1789–1848.) A German teacher. Born in Auerbach, Saxony, he studied theology in Jena, and, as the tutor of some young Englishmen, went to Pestalozzi's Institute in Yverdun (1811–1813). From 1815 to 1817 he was again with Pestalozzi, and from 1820 until his death he taught at the Musterschule in Frankfort-on-the-Main. He published *Erinnerungen aus meinem Leben bei Pestalozzi* (*Reminiscences of my Life with Pestalozzi*).

ACLAND, SIR THOMAS DYKE, Baronet. — (1809–1898.) One of the founders of University Local Examinations for Secondary Schools in England; eldest son of Sir Thomas Dyke Acland, tenth Baronet; educated at Harrow and Christ Church, Oxford; friend of F. D. Maurice, W. E. Gladstone, and the leaders of the Tractarian Movement in Oxford; Fellow of All Souls College, Oxford (1831); M.P. for West Somerset 1837–1841, for North Devon 1865–1885, and for the Wellington Division of Somerset 1885–1886; opposed (1839) government plan for establishment of Education Department; actively engaged in organization of elementary schools and training colleges upon a diocesan basis in connection with the Church of England; hoped to develop the work of the National Society (*q.v.*) (Church of England) so as to include establishment and maintenance of secondary schools. As a country gentleman possessing large estates and actively interested in the scientific development of agriculture in the west of England, he realized the need for the improvement of the schools to which farmers sent their sons and daughters. In 1857 he adapted the idea of Local Examinations (introduced shortly before by the College of Preceptors and by the Society of Arts) to the educational needs of the west of England, being assisted in this undertaking by Dr. Temple, then on the staff of the Education Department and subsequently headmaster of Rugby and Archbishop of Canterbury. Among the first examiners were Professor Max Müller, Dr. Voelker, Mr. George Richmond, R.A., and Mr. Hullah. Acland was inclined to place these local examinations under the direction of the Education Department, but the government declined the responsibility, which, had it been accepted, would probably have led to the establishment of state Leaving Examinations for secondary schools. In the meantime the older universities (first Oxford and immediately afterwards Cambridge), anxious for the improvement of the intellectual standard in secondary schools and distrustful of what might lead to a state monopoly of intellectual control in English secondary and higher education, undertook the management of the system of Local Examinations (1858). Thus the English universities for the first time took a definite part in the education of persons who were not matriculated members of the university. From this root have grown the Local Examinations of Oxford, Cambridge, and other universities, the Oxford and Cambridge Schools' Examination Board, and the systems of University Extension lectures and classes. Through his high social position and intimacy with influential friends at Oxford and in London, Acland was able to render indispensable service to a movement which furnished an authoritative and independent test to the results of the teaching in secondary schools, and which drew the older universities into intimate relationship with secondary education at a critical period in its development and reform. His efforts, combined with those of Dr. Temple, the Rev. J. L. Brereton, Lord Ebrington (afterwards Earl Fortescue), Mr. Harry Chester, and others, provided through the universities a form of external test of the intellectual work of English secondary schools, which for nearly forty years proved a substitute for state inspection, and is still concurrent with it. Acland's instincts were adverse to any educational monopoly on the part of the secular State. From 1864 to 1867 he served on the Schools' Inquiry Commission, which laid the basis for the reform of English secondary schools of the middle grade.

In 1890 (æt. 81), as a stanch member of the Liberal party, Acland publicly declared in favor of retaining religious instruction in elementary schools, and for the maintenance of Voluntary Schools (*q.v.*), connected with the various religious bodies (as alternative schools were required by parents in areas in which choice of schools could be allowed), but he was emphatically opposed to the claim of subscribers (public funds finding most of the money) to dictate the whole of the religious education to a parish where there was only one school. He advocated representation of the parents on the Managing Committee of each Voluntary School. M. E. S.

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ACOUMETER. — See Audiometer.

ACOUSTICS. — The science which treats of sounds and their relations. This science includes a treatment of noise, sensation, and tone sensation.

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ACQUIRED CHARACTERISTICS. — Those physical or mental traits of any organism which are due to its own life history rather than to its heredity. These traits include modifications due to climate, nutrition, chemical agencies in the environment or pressures, the effects of use and disuse, mutilations, habits, and experience. Since the acquired is opposed to the hereditary characteristic, the contrast between the two is essentially that between education and heredity (*q.v.*).

It is often difficult to distinguish between characteristics that are hereditary and those that are acquired. The leading cause of this difficulty lies in the fact that with the higher species, in the lives of which infancy is the first period, the hereditary traits are only in part displayed at birth. It follows that to a great extent they appear only after educational influences have had a chance to work. Hence, one often is at a loss whether to ascribe them to education or to heredity. For example, the ability to walk is plainly in part inherited. The child is born with the bodily apparatus which makes the act in question possible. At first, however, he cannot walk. He gains that power usually through a process of experimental efforts, such as are involved in learning any habit. It would seem, then, that the ability to walk is in part an acquired characteristic. On the other hand, children have been observed who for some reason never tried to walk until all the apparatus involved had fully matured. Then, when they were suddenly moved to make the attempt, they walked and ran as perfectly as children of the same age who had learned these arts by the ordinary process.

Such discoveries as this have led many to regard a large part of the training of children as merely an anticipation of heredity, and so labor lost, as well as a source of vexation both to the young and the old. Hence, they have urged with Rousseau that we should leave the child largely to nature, whose benevolent provisions our culture merely forestalls, if it does not impair. It is evident that very many of the mental and moral characteristics of men which seem to be learned may in reality be due largely, if not wholly, to heredity. They are perfect or nearly perfect instincts, instead of being imperfect ones, such as require education to be brought to a condition for efficient functioning. The same may be said of physical traits. Many weak and sickly children grow into strong and healthy men. This is usually attributed to regimen, when in reality it may often be due to heredity.

On the other hand, there can be no doubt that men often regard as hereditary what is in reality only an acquired characteristic. Thus such mannerisms of children as are to be found in parents or others in the family may be regarded as inherited, when in point of fact they are due to imitation. There is evidence that among the lower animals many complicated instincts, such as the building of nests by birds, may be not perfect by heredity, as has been supposed, but may instead require help from the imitation of models in order to display their standard efficiency. So, too, diseases which have been ascribed to heredity are often due to infection, like tuberculosis, which is not inherited, or to sanitary conditions similar to those of the parents. Intemperance is, doubtless, inherited to a far less extent than has been commonly held; most cases of apparent inheritance being due to the contagion of example, supported often by inherent neurotic tendencies. The famous Jukes family, some 1200 of whom were catalogued as belonging to the criminal, licentious, or vicious class, would seem to be a marked illustration of hereditary crime; yet some few cases where members of the family were isolated from the rest and developed in quite a normal way seem to indicate that the characteristics for which the stock was infamous were largely acquired.

Indeed, it may be said that in the adult of the higher species, especially in the mature man, there are very few characteristics that have not been in a measure determined by environmental influences. The infant is in every part so susceptible to such influences that it seems to be made up largely of potentialities for development rather than fixed forms of adjustment. Its dominant hereditary trait is capacity for education, for acquiring characters. This is true of the body as a whole, but especially of the nervous system and the brain. The latter organ seems to exist solely for the sake of enabling new habits to be acquired. It consists of centers which are connected with all the sense organs and all the muscles of the body, together with an astonishingly intricate mass of association fibers connecting these centers. Since these cerebral associations are not, as a rule, made definite until experience has organized them into habits, a human being, in whom the brain controls a very large part of the movements of the body, acts in an immature and aimless manner until experience has taught him otherwise. Cerebral control means capacity to acquire habits, with a corresponding helplessness until these habits shall have been formed.

But if with the mature of the human race there are very few characteristics which are not in a measure acquired, so with even greater truth may it be said that there are very few which are not in part dependent on heredity. Indeed, if we except negative mechanical or chemical effects, such as mutilations or modifications of tissue by chemical agencies, it would seem that all the rest are a result of positive potentialities for development on the part of the individual, which in turn are due to heredity. The power to learn is made up of the power to develop in a great many ways, each of which is dependent upon something in the structure or other properties of the body, and is in consequence inherited.

One of the most interesting questions concerning acquired characteristics is whether they can become hereditary. So important is this issue that it has split the naturalists who are especially concerned in the mechanism of evolution into two hostile camps, and although the controversy does not to-day rage so fiercely as it did in the last decade of the nineteenth century, it is still an issue for debate.

The natural belief of humanity is unquestionably that the characteristics acquired by the parents are, in part at least, engrafted upon the heredity of the child. This is especially the view in regard to evil traits. "The sins of the fathers shall be visited upon the children." "The fathers have eaten sour grapes and the children's teeth are set on edge." So natural an assumption is this that Lamarck (*q.v.*), a French naturalist (1744–1829), endeavored to explain by it the evolution of species. One has only to suppose that the effects of use and disuse upon the body and functions of the parent are transmitted in part to the child, who in turn develops still further in the same direction, in order to have an agency by which in a comparatively small fraction of geological time extraordinary changes in structure and capacities might be brought about. Thus Lamarck conceived the evolution of species to be the outcome of the individual activities that make up its history. The heredity of a stock is thought to be, like the constitution of a nation, a product of successive efforts in successive generations to develop a satisfactory working organism. What the fathers achieve, the children have thrust upon them. Evolution is a result of effort, and, since the efforts of different individuals differ both in intensity and direction, their children are born with different characteristics, which they in turn develop differently owing to variety in circumstances and in energy. Thus species are differentiated, and we have the variety of life seen in the world to-day.

Darwin (*q.v.*) (1809–1882) developed a new notion of the method of evolution. By studying the methods by which breeders and nurserymen improve the qualities of animals and plants under domestication, he found that it was by breeding only from those that showed the most desirable qualities and destroying the rest. This process he called artificial selection. It is to be noted that the qualities for which the selected individuals are chosen are not acquired. The breeder does not find it necessary to train a horse to run faster than it would naturally in order to get a parent for a better stock. Rather he chooses among all his horses the one that is by nature fastest. Thus in developing his improved stock he relies on chance variations in natural speed rather than on the effects of training.

What Darwin saw going on under the control of man he conceived to be taking place under the pressure of competition in nature. Since animals and plants in a state of nature chance to vary from each other in numberless ways, and since there is an enormous loss of life among them from competition, those that tend to survive and to reproduce their kind will be on the whole those best adapted to survive, the fittest. The constant variation in all directions and the constant elimination of the unfit will in time break up any stock into varieties each of which has become quite well adapted to that specific environment which is most available for it. Hence, there will be differentiation of species into varieties. But as these varieties separate more and more widely from others that sprang from the same parentage, they tend more and more to evolve into distinct species.

Darwin laid most stress on evolution by natural selection operating on chance variations, but he did not reject the idea that there might be evolution by the inheritance of the effects of use and disuse. On the contrary, he accepted this as a genuine factor in the origin of species. The followers of Darwin have, however, in some cases refused to believe in the inheritance of acquired characters. Those who hold this view, which places the burden of explaining evolution almost if not quite entirely upon natural selection, have been called Neo-Darwinians. Their leader is August Weismann, Professor in the University of Freiburg. His contention that there is no inheritance of acquired characters among multicellular animals is based on his conviction that the physiological mechanism of heredity is such as to render this transmission impossible. The germ from which the new individual springs is distinct from those body cells of the parent the modification of which gives rise to acquired characteristics. That there exists a mechanism by which the acquired traits of the body cells can be transported through the body and made to influence the character of the germ cell is, according to Weismann, incredible. Moreover, it is unnecessary to construct an hypothetical explanation for such transmission, since a careful examination of the facts shows that the supposed fact of inheriting acquired characteristics is a myth. All cases that have been held to be illustrations of this turn out on inspection to be either traits not inherited but rather acquired by the child, or traits not acquired but inherited by the parent. The fact is, he maintains, the child inherits only what the parent inherits, plus such variations as chance or a mixture of blood tends to produce.

The views of Weismann raised up a host of opponents as well as of defenders. Those who maintain the genuineness of the inheritance of acquired characters have been called the Neo-Lamarckians. They have devoted themselves to a search for cases that would incontestably prove such inheritance. Opinions differ as to whether they have succeeded. The case, reported by Brown-Sequard, of the inheritance in guinea pigs of epilepsy that originally was caused by mutilations has been, perhaps, the most convincing instance that they have offered. Mutilations are demonstrably not inherited. No evidence exists to support the notion that habits or acquired mental traits can become hereditary. Where the effects of climate, nutrition, or mode of life are so general as to be capable of affecting the germ as well as the body cells, there we may seem to have some evidence of what might be taken to be the inheritance of acquired traits, but such cases are few, and the effects are rather indefinite. Professor James characterized this evidence as " a beggarly array." On the other hand, the Neo-Lamarckians have raised up to face the Neo-Darwinians two formidable objections. One is that, if we reject the inheritance of acquired characteristics, we have discarded the only intelligible account of the origin of the variations on the basis of which the progress of evolution is made, and have left only the mysterious chance variation. The other is that such slight variations as originate by chance can hardly be supposed to give their possessor any such substantial advantage in the struggle for existence as will enable him to survive when others perish. In that event, there remains no " survival of the fittest," and hence no evolution.

The first of these objections has been met by a counter-objection. It is maintained that the acquired characteristics, so far from explaining evolution in the powers of living beings, are themselves based on hereditary possibilities of development. The acquired characteristic cannot be used to explain a potentiality for growth upon which it itself is based. The increase in powers which evolution has brought about cannot, then, be explained by the uses to which these powers have been put, but only by an inherent tendency for living tissue to vary, to develop new possibilities for growth. This view, it will be noted, is substantially in accord with the notion of the relationship between acquired characteristics and hereditary powers which was outlined earlier in this article.

The second objection has threatened the whole Darwinian notion of evolution by natural selection. It may be well to note one ingenious attempt to explain how slight chance variations might prove more useful than is at first apparent. Professors Baldwin and Osborn in America and Morgan in England have suggested a factor that they have called organic selection. Slight chance variations in themselves of no significance may, these writers affirm, be a basis for the development through educative influences of perfected habits which are of the greatest advantage. The organism selects, as it were, these apparently insignificant factors in its equipment. It develops them by use until they become genuine sources of strength. A slight tendency to build a nest would result in so imperfect a product that the eggs would fail of protection and the species gain no advantage. On the other hand, it might afford a basis from which through imitation and experience the bird might build a very safe home for its unhatched brood. The slight variation would thus assist in the survival of its possessor. In subsequent generations it might grow greater, and thus in the long run heredity would gain a substantial improvement. In singling out and improving the slight variation, the organism would have selected the path along which its heredity should improve. Thus the acquired character, while it is not inherited, would, nevertheless, determine the pathway of improvement in inheritance.

It is evident to any one that, whatever we say about the inheritance of *any* acquired characteristics, at any rate relatively very few of them are so transmitted. The vast mass of the acquisitions of the human parent have to be acquired by the child. Language, manners, ideals, vocational skill, experience, each generation must get for itself. It would seem like a great misfortune that the inheritance of acquired characteristics should not have prevailed more extensively. On the other hand, a little reflection will convince us that nature, in shutting us off from this easy method of sharing in the outcome of the development of our parents, has been beneficent rather than the opposite. For we are saved from the incubus of an enormous number of habits useful to our fathers, but useless or a positive detriment to us, and of habits useless or injurious even to those ancestors who formed them. At the price of having to learn for ourselves the valuable habits and ideas of our parents, we gain immunity from those that would impair our own efficiency. When one considers the rapidity with which in the recent history of man the manners, institutions, and ideals of society have changed, the non-inheritance of acquired characters becomes in his mind inevitably correlated with progressiveness.

E. N. H.

See also Child Psychology; Culture Epoch Theory; Darwin; Evolution; Infancy; Habit; Heredity; Lamarck; Mendelianism.

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ACQUISITIVENESS.— Animals as well as human beings show an instinctive tendency to acquire and retain those objects which attract them, either because of the stimulation offered to their senses, or because of the satisfaction which these objects afford to instinctive desires. Acquisitiveness has accordingly been described as a fundamental instinct.

See Instinct.

ACTION WORK. — A phrase applied to a special method or device used in teaching reading to young beginners, particularly foreign children with little comprehension of oral English. The child converts the print on the page into spoken English, with or without the aid of a phonetic system or diacritic marks, and then acts out the statement to prove he possesses its meaning. The device has many variations, all intended to avoid a mere mechanical reading of sounds without meaning. One of the most frequent variations is for the teacher to write a command upon the blackboard, which is read silently by the children, one of whom is designated to carry out the command. The necessity of some action as the outcome of the reading focuses attention on meaning rather than on mere visual form or pronunciation, and reveals at once any failure of the child to get the thought of the sentence. Lessons where action work is dominant are frequently called "action lessons."

See: Reading, Teaching of.

ACTIVITY. — Psychological Significance of. — This is the most general term applied to all organic processes. In ordinary use it is employed to describe the contractions of the muscles. In physiology it is used to describe the processes that go on in all living cells. In psychological literature it is used either as synonymous with the general term "consciousness," which is very frequently referred to as mental activity, or as synonymous with the particular term, "volition," which is regarded as the dynamic side of consciousness. The term is of special significance in educational discussions because of the contrast which is sometimes drawn between receptivity as the passive phase of mental life and self-activity as the aggressive or dynamic side. In technical psychological studies emphasis has of late been placed upon the active processes. Thus Professor James has laid great emphasis in his theory of the emotions upon the bodily activities which are related to these emotions (see EMOTIONS). The processes of perception have been recognized as intimately related to bodily activities. Thus Wundt lays great stress upon eye movements as important elements in visual perception (see VISUAL PERCEPTION). Both of these writers treat activities as important because of their contribution to new incoming impressions either from the muscles or from the joints or from other active organs. This formula, whereby activity is treated as important for mental life because of the impressions which it produces, has of late been subjected to severe criticism. Photographs of the eye do not support fully the contentions of writers who have emphasized eye movements as important sources of visual sensation. The other movement sensations of the body are far too gross to explain the precision with which we perceive our relations in space to objects in the world about us. A series of theories have accordingly been developed which promise to throw great light upon the psychological problems connected with all forms of education, especially with manual training and constructive work. Professor Münsterberg holds that mental life is conditioned by the openness of motor channels in such a way that clearness and vividness of impressions depend upon the openness of these motor channels. Stout, after criticizing James' theory of the emotions, calls attention to the fact that emotions are agreeable when the motor tendencies present in any given situation are harmonious, and disagreeable when the motor tendencies are inharmonious. The general principle of coördination of motor tendencies may very advantageously be employed to explain many of the processes of perception. Wherever we recognize an object, there is an elaborate active reaction of the individual as well as a sensory impression. C. H. J.

See SYMPATHY, IMITATION, and SELF ACTIVITY.

Activity; Logical Theory and Educational Implication of. — For educational purposes this concept may be defined as a series of changes definitely adapted to accomplishing an end. Hence it is opposed to restless and random changes, as well as to mere quiescence and passive absorption. Dictated exercises, "busy work," etc., when not accompanied by any sense of a result to which they naturally contribute, are not activity in its genuine, or intellectual, significance; neither is undirected overflow of motor impulse. By way of emphasizing the conscious share of the individual in the initiation and execution of a series of changes directed to an end, activity generally appears in educational literature as *self-activity*. Under the influence, however, of a dualistic philosophy (see DUALISM), self-activity has usually been conceived not as all chances consciously directed toward an end with the attainment of which the self has become identified, but as purely mental or psychical. The mind having been separated from the external world and from the body, its activity had to be conceived quite independently of any changes effected among objects or through the body.

The result in education was to give higher education a one-sided direction. Abstract studies, since they involve a minimum of overt action, were regarded as the appropriate material of self-activity. Owing to the influence of Aristotle, pure activity was identified with the operation of pure reason, a process beginning and ending exclusively in the mind and expressed wholly in logical terms. This type of activity characterized liberal or free education, which was then contrasted with professional and mechanical education, as concerned with arts that took effect in some modification of the body (such as medicine) or external objects, such as the fine and the industrial arts. This lower (base) type of activity and the education concerned with it had not to do with mind in its integrity and purity, but with mind as affected by want or lack, — appetite and external physical circumstances.

Although this dualistic and exclusively intellectualistic philosophy is rarely openly professed to-day, it has had great historic influence, much of which still survives. Embodied in the scholastic theory of the superiority of the contemplative to the practical life, it was revived in another form in the humanism of the Renaissance; and finds an echo to-day in the assumption that all professional and even useful education must be illiberal and noncultural. While the school practices in question were due not to the theory, but to social conditions which put the stamp of the ignoble and menial upon all economic concerns, yet the theory gave a convenient formulation and seeming justification for the practice of divorcing education for culture and for vocation from each other.

At the present time, many forces are coöperating to give to the notion of activity a wider and less exclusive content; and, by relieving it of its excessive intellectual associations, to make it a central principle of all sound educational methods. In other words, "self-activity" is losing its purely philosophical meaning, and is becoming identified with all types of directed action in which the purpose, choice, and reflection of the individual take a part.

Some of the causes of this change are as follows: (1) The development of democracy has tended to break down the association of higher culture with economic leisure, and to emphasize the necessity of active social service. (2) Modern industry has become more and more dependent upon the application of science. so that it has lost its purely material and mechanical character by gaining an intellectual content. On the other hand, the sharp boundary between pure and applied science has given way through the increase of facilities for putting even remote and abstract branches of knowledge to some social service. (3) Modern psychology has substituted the notion of a unified psychophysical activity for the older dualism of soul and body. In multitudes of ways, it has demonstrated the coöperation of mind and body to be indispensable. Hence physical activity, instead of being considered an intruder or accidental annex in the training of mind, is seen to play an organic part. (4) Modern dynamic or functional logic has shown that reflective thinking is called forth by the need of coördinating conflicting activities into a harmony, and that the main lines of the organization of thoughts are set by the model of practical activities. (See CONFLICT and CONTROL.)

The single fact that all conclusive scientific thinking requires experimentation involving the production of physical change is enough in itself to destroy the older notion that the highest mental activity is purely self-inclosed and self-sufficient.

Some of the effects of the increased importance of the principle of activity in education may also be noted: (1) The kindergarten rests professedly upon this notion. The rediscovery by Froebel of the significance of play and of occupation (Plato having been the original discoverer) marked an epoch in education. (2) The introduction into elementary education of various forms of constructive and expressive activity. While the arts (like drawing) and manual training (cooking, sewing, work with wood and metal) were first introduced mainly for utilitarian reasons, when once introduced they were found to serve important intellectual and moral ends. The introduction of school gardens, excursions, etc., mark further tendencies in the same direction, as do also the greater attention to games and to physical culture. (3) The recognition that scientific study in education is incomplete without provision of laboratories and other opportunities for active work is another aspect of the same principle. That the best thinking involves research, personal inquiry, and is not to be secured by amassing and absorbing stores of information is a notion destined ultimately to revolutionize methods of instruction. (4) The increasing interest in vocational education, the feeling that education comes short of its proper function unless it assists the individual in his choice and pursuit of a right calling in life, is another evidence of the fundamental significance attached to the principle of activity.

See article on FUNCTION. J. D.

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ADAMS, CHARLES KENDALL. — Historian and educator, born at Derby, Vt., Jan. 24, 1835; educated in the public schools, at Derby Academy, and the University of Michigan; professor of history and Latin at Cornell University (1863–1867) and of history at the University of Michigan (1867–1885); president of Cornell University (1885–1892) and of the University of Wisconsin (1892–1902); author of *Higher Education in Germany* and of several historical works. His *Manual of Historical Literature* (New York, 1889) is important as a general historical bibliography. Died July 26, 1902. W. S. M.

ADAMS, DANIEL (1773–1864). — Schoolman and textbook-writer, educated in the schools of New Hampshire and at Dartmouth College; principal of a private school in Boston (1803–1813); author of textbooks in arithmetic, grammar, and reading which were widely used in the schools of New England for many years. W. S. M.

ADAMS, HERBERT BAXTER. — Historian, born at Shutesbury, Mass., April 16, 1850; educated at Phillips Exeter Academy, Amherst College, and the University of Heidelberg; instructor and professor of history at Johns Hopkins University (1876–1901); author of *Study of History in American Colleges and Universities, College of William and Mary, Thomas Jefferson and the University of Virginia,* and of numerous historical works; also editor of *Contributions of American Educational History* published by the Bureau of Education; died July 30, 1901. W. S. M.

ADAMS, JOHN (1772–1863). — Schoolman educated in private schools and at Yale College; instructor in Canterbury (Conn.) Academy; principal of Phillips Academy at Andover (1810–1833); during his closing years actively engaged in Sunday school work in Illinois; author of numerous pamphlets on education. W. S. M.

ADAMS, JOHN QUINCY (1769–1848). — Sixth president of the United States, educated in private schools in Paris, at the University of Leyden and Harvard College; professor of rhetoric and *belles lettres* at Harvard College (1805–1809); author of *Lectures on Rhetoric and Oratory.* W. S. M.

ADAMS, WILLIAM TAYLOR (1822–1897). — Schoolman and story-writer, educated in the public and private schools of Boston; teacher and principal in the schools of Boston for 26 years; editor of *Student and Schoolmate* (1858–1866); wrote under the pseudonym "Oliver Optic" numerous stories for the young. W. S. M.

ADAPTATION. — The maintenance of life requires an adaptation of the organism to its surroundings, of the human individual to the natural and social medium in which he is placed. Disturbance of adaptation means disease — physical, mental, moral; and though the capacity of human beings to adapt themselves to abnormal conditions is very great, maladjustment, if extreme and long continued, results in death or arrest of growth. The entire process of education (*q.v.*) may properly be regarded as a process of securing the conditions that make for the most complete and effective adaptation of individuals to their physical and moral environment.

Adaptation is of two types, passive and active, though the distinction is one of degree, not of kind. Passive adaptation is discussed under the caption of accommodation (*q.v.*). As there noted, the accommodations in which the individual takes on the coloring of his surroundings depend upon his own primary native activities. In progressive societies, then, activities are to an extent directed toward securing an adaptation of the environment to the individual's needs and ends, rather than vice versa. Lower forms of life have only a limited power to adjust themselves to changes in their surroundings; if their conditions vary markedly or suddenly, they die. Under ordinary conditions they reach a stable equilibrium, which means arrest of growth. Continued growth means that the individual does not accommodate himself to his environment, but takes the initiative in modifying it to make it over into accord with his own desires and purposes. Only when the environment develops by the active initiative and planning of individuals is progress secured. All invention and discovery are cases of active adaptation.

Spencer's influence is largely responsible for the popular misconception by which both education and evolution are construed as the molding of pliable and passive organic beings into agreement with fixed and static environing conditions. This view leads to a perversion, practical and theoretical, of education, since it makes its aim the accommodation of individuals to the existing type of social polity and customs, a method which may train followers, but not leaders. To avoid this error, it is necessary to realize that adaptation is a case of control (*q.v.*) involving the subordination of the environment to the life functions of individuals. The North American Indians accommodated themselves to their surroundings on our Western plains and deserts, and the result was a low and precarious culture. Civilized man employs migration, machinery, means of transportation and communication; and by adapting these same surroundings to his own ends controls the environment instead of having his development controlled by it. Herein lies the difference between stationary and progressive societies, between civilization and savagery, between higher and lower forms of animal life. (See besides ACCOMMODATION and the references there given, EVOLUTION and FUNCTION.) J. D.

Biological Adaptation. — Besides its general philosophical and social significance, the term "adaptation" has definite biological and sensory connotations that have significance educationally.

Biologically the term refers to the fact that every organism tends to undergo through natural selection or individual modification a succession of changes whereby its functions are rendered more harmonious with the demands of the environment. Thus plants which live in an arid region adapt themselves to the environment by developing organs for the retention of moisture. Animals that live in a cold climate develop coverings which protect them against the cold. The term has been employed in connection with mental development to indicate that the mental processes are more advantageous as means of fitting an individual to the environment than mere organic changes.

Sensory Adaptation occurs when any organ of the body is acted upon by external energy which then undergoes a change such that subsequent processes in that organ show the effect of the earlier excitation. This is especially true of the organs of sense. When the eye has been exposed to light for a time, it is less sensitive than when it has been exposed in darkness. These states of the eye are defined respectively as daylight adaptation and darkness adaptation. The sense of smell and the temperature sense are especially affected by earlier excitations. The phenomenon is akin to fatigue (*q.v.*) and after-image (*q.v.*). C. H. J.

ADDISON, JOSEPH (1672–1719). — Son of Lancelot Addison, Dean of Lichfield; educated at Charterhouse and Queen's and Magdalen colleges, Oxford; established the *Spectator* in 1711. In this periodical, which had a wide circulation, he used his influence to secure reforms in English education. In No. 157, August 30, 1711, the writer states: "I have very often with much sorrow bewailed the misfortune of the children of Great Britain, when I consider the ignorance and undiscerning of the generality of schoolmasters. The boasted liberty we talk of is but a mean reward for the long servitude, the many heartaches and terrors, to which our childhood is exposed in going through a grammar-school. Many of these stupid tyrants exercise their cruelty without any manner of distinction of the capacities of children, or the intention of parents in their behalf. There are many excellent tempers which are worthy to be nourished and cultivated with all possible diligence and care, that were never designed to be acquainted with Aristotle, Tully or Virgil; . . . I am confident that no boy who will not be allured to letters without blows, will ever be brought to anything with them. . . . It is wholly to this dreadful practice" (*i.e.* of indiscriminate corporal punishment in schools) "that we may attribute a certain hardiness and ferocity which some men, though liberally educated, carry about them in all their behaviour. . . . But since this custom of educating by the lash is suffered by the gentry of Great Britain, I would prevail only, that honest heavy lads may be dismissed from slavery sooner than they are at present, and not whipped on to their fourteenth or fifteenth year whether they expect any progress from them or not. Let the child's capacity be forthwith examined, and he sent to some mechanic way of life, without respect to his birth, if nature designed him for nothing higher. . . . I would not here be supposed to have said that our learned men who have been whipped at school, are not still men of noble and liberal minds; but I am sure they had been much more so than they are, had they never suffered that infamy."

The influence of the *Spectator*, which continued to be read as a classic throughout England, was a strong factor in mitigating the tradition of severity among English schoolmasters. In the *Spectator*, No. 215, November 6, 1711, the writer strongly urges universal education: "I consider a human soul without education like marble in the quarry, which shews none of its inherent beauties, until the skill of the polisher fetches out the colours, makes the surface shine, and discovers every ornamental cloud, spot, and vein that runs through the body of it. Education, after the same manner, when it works upon a noble mind, draws out to view every latent virtue and perfection, which without such helps are never able to make their appearance. . . . What sculpture is to a block of marble, education is to a human soul. The philosopher, the saint, or the hero; the wise, the good, or the great man, very often lie hid and concealed in a plebeian, which a proper education might have disinterred, and have brought to light."

It should be noted that Addison's father was a native of the County of Westmoreland, in which part of England throughout the seventeenth and eighteenth centuries education was much more highly valued by and generally accessible to the masses of the people than elsewhere in the country. Thus Addison grew up with a knowledge of the benefits of popular education which doubtless affected his point of view. He was a strong advocate of the educational movement which, in the early years of the eighteenth century, led the Church of England to develop charity schools (*q.v.*) for the children of the poor, and thought the foundation of these schools one of the most beneficent undertakings of the age. He describes Sir Roger de Coverley, his type of an English country gentleman, as employing an itinerant singing-master, who goes about his estate to instruct the people rightly in the tunes of the Psalms, so as to improve the singing in church. Sir Roger follows the public catechism in church, and, when pleased with the boy who has answered well, orders a Bible to be sent him next day for his encouragement, sometimes accompanying it with a flitch of bacon for the lad's mother. Addison's influence was strong in forming the code of public duty to which enlightened landholders endeavored to conform in England from the beginning of the Hanoverian period. This code was further popularized by Samuel Richardson in his novel *Sir Charles Grandison* (1753). Its religious earnestness was deepened by the Evangelical movement followed by the Tractarian movement. In all its stages it included the duty of providing a humble, but by no means ineffective, form of elementary education for the laboring poor. M. E. S.

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ADDITION. — A term used in mathematics to indicate the joining of two quantities to form a single quantity. In particular, in elementary arithmetic we add 2 and 3 and say that the result is 5; in advanced arithmetic we add 2 and − 3 and say that the result is − 1; in complex numbers we add $a + bi$ and $a' + b'i$ and say that the result is $(a + a') + (b + b')i$, where $i = \sqrt{-1}$. Similarly we have $\sin^2 a + \cos^2 a = 1$, and other forms capable of reduction in various parts of mathematics, all developments of the idea of addition in elementary arithmetic.

The name of this process has had various vicissitudes. Johannes Hispalensis (John of Seville, John of Luna), a Spanish Jew of *c.* 1140, called it "aggregation": "Aggregare est quoslibet duos numeros vel plures in unum colligere." The earliest French treatise on algorism (*c.*1275) uses "assemble" for add : "Se tu veus assamble 1. nombre a autre." The first printed arithmetic (Treviso, Italy, 1478) uses "join" in the same sense. "Summation" has long been a rival of "addition," a trace of this use being preserved in the expression "to sum up," and "to sum these numbers." Grammateus (1518) speaks of "Additio oder Summierung," and Rudolff (1526) of "Addirn oder Summirn." The Germans also used "Zusammenthuung," the French "aiouster," and the Italians "recogliere," "summare," and "acozzare."

The numbers to be added had no special names in the earlier books of the people. The theoretical books, written in Latin, commonly spoke of them as "numeri addendi," numbers to be added, from which came the word "addendi," or our "addends." Finæus used this term as early as 1525, and Gemma Frisius (1540) probably did more than any one else to make it popular. Sometimes only the lower of two numbers to be added was called a "numerus addendus," as in the work of George of Hungary (1499).

The result of addition has had a variety of names, although "sum" has been the favorite. "Product" has also been used, as by John de Muris (*c.* 1320), and etymologically it has as much reason for being used in addition as in multiplication. Even as late as 1563 Savonne writes, "Adiouster est mettre plusieurs nombres ou sommes ensemble, pour en sçauoir le produit," thus following a common custom of using "sum" for number, and "product" for the result of addition. "Numerus collectus" has also been used, which might naturally have led to the use of "collect."

The method of adding numbers, when mechanical aids (see ABACUS) were not employed, has changed but little. A commentator of unknown date, writing on the Lilāvati (see BHASKARA), gives this method for adding 2, 5, 32, 193, 18, 10, and 100.

Sum of the units, 2, 5, 2, 3, 8, 0, 0	20
Sum of the tens, 3, 9, 1, 1, 0	14
Sum of the hundreds, 1, 0, 0, 1	2
Sum of the sums	360

In the fourteenth century Maximus Planudes (*q.v.*), whose work was much influenced by the Arabs, placed the sum at the top, checking (see CHECKS ON OPERATIONS) his result by casting out nines, as here shown. The method was purely Arabic. The Hindus, on the other hand, seem to have commonly written their results below, beginning at the right as we do, but canceling unnecessary figures. They also had what they called a retrograde method, beginning at the left.

8030	2
5687 2343	8 3

The expression "to carry" in addition is very old, being derived from the carrying of counters on the line abacus. (See ABACUS.) It is found in most if not all European languages. In English it has been perhaps less popular than in some other languages, Recorde (*c.* 1540) using, for example, the expression "keepe in mynde," and Baker (1568) using "keepe the other in your minde."

$$\begin{array}{r} 65391 \\ 3279 \\ 10420 \\ \hline 7\cancel{8}\cancel{9}\cancel{8}0 \\ 909 \end{array}$$

D. E. S.

ADDITION, Psychology of. — See NUMBER, PSYCHOLOGY OF.

ADELHARD, or ÆTHELHARD, of Bath. — A monk of the twelfth century, probably born at Bath, England. At one period of his life he traveled widely, visiting Spain, Greece, North Africa, Egypt, and Asia Minor. He may have lived for a time in Sicily. In his travels he came into contact with Arabian thought, to which are due some of his works on mathematics, medicine, and philosophy. His most important work was a translation into Latin of Euclid's *Elements* from the Arabic (though some claim without justification that it was from the Greek). This work was used extensively in the thirteenth and fourteenth centuries. About 1260 Giovanni Campano issued the translation as his own work. The first printed edition appeared at Venice in 1482. His most important philosophical works are *Perdifficiles Quaestiones*, which is representative of his acquaintance with Arabic teachings, and *De Eodem et Diverso* (*Of Identity and Difference*), an attempt to reconcile the theories of Plato and Aristotle on universals.

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ADELPHI COLLEGE, BROOKLYN, N. Y. — A coeducational, nonsectarian institution, incorporated by the Regents of the State of New York (see UNIVERSITY OF THE STATE OF NEW YORK), June 24, 1896. Besides the usual undergraduate courses, admission to which is by examination or certificate from high school, the college maintains a Normal School for Kindergartners with a two-years' course organized in 1893, a Normal School for Art Teachers, formed in 1903, and a School of Fine Arts developed from the art courses in Adelphi Academy, a preparatory school founded in 1863, which was the parent of the college, and which remains an important part of its system. The college, which has always emphasized preparation for teaching, offers also extension courses that enable public school teachers to make progress toward a degree without giving up their positions. Pedagogical studies may be taken as part of the work of the college proper, and, if satisfactorily completed, admit to the New York City examinations for licenses to teach in the public schools and make the student eligible to receive the College Graduate Professional Certificate issued by the State Education Department at Albany. Adelphi College is the only institution in Brooklyn from which a woman may obtain a bachelor's degree. There are no fraternities. The students are organized in self-government associations, and the "honor system" is maintained. Adelphi College is a member of the Association of Colleges in the Middle States and Maryland (*q.v.*) (see College Entrance Boards). There are about 500 students; in 1908 the degrees conferred were, M.A., 3 (all for educational researches), A.B., 45. The college is controlled by a self-perpetuating board of trustees; three of the members (1909) are women. The instructing staff numbers 36, of whom 16 are full professors. The grounds, buildings, and equipment were valued (1906) at $530,055. The total annual income is $54,000. The average salary of a professor is $2000. Charles H. Levermore, Ph.D., is president. C. G.

ADELUNG, JOHANN CHRISTOPH (1732–1806).—A German lexicographer and grammarian, born in Spantekow, Pomerania. After studying theology at the University of Halle, he taught at the evangelical gymnasium in Erfurt (1759–1761), but had to leave because of his rationalism. The next sixteen years he spent in literary work in Leipzig, and in 1787 was appointed chief librarian of the electoral library in Dresden, which position he filled until his death. Adelung's great work is his dictionary of the German language (*Grammatisch-kritisches Wörterbuch der hochdeutschen Mundart*, 5 v., Leipzig 1774–86), by far the most important work of its kind before Grimm. His German grammar, written 1781 by the order of Minister von Zedlitz, remained for a long time the standard of German schools. Among his other works are: "*Über den deutschen Stil* (*On German Style*, 3 v. 1785–1786), *Aeltere Geschichte der Deutschen, ihrer Sprache und Literatur* (*Ancient History of the Germans, their Language and Literature*, Leipzig, 1806); and *Mithridates oder allgemeine Sprachen-Kunde* (*General Linguistics*, Berlin, 1806), in which the conception of a science of comparative philology is foreshadowed. Besides these, he made valuable contributions to the study of medieval Latinity and of the history of Saxony. From 1772 to 1774, he published the *Leipziger Wochenblatt für Kinder* (*Leipzig Weekly for Children*), the first German periodical for young people. F. M.

ADENOIDS. — (Greek ἀδενοειδής, glandular.) The so-called adenoid growth is really an hypertrophy of the nasopharyngeal tonsil, or what is sometimes called the third tonsil, situated in the cavity between the nose and throat. Many different causes have been assigned for such growths, but no specific cause has yet been established. There is, however, a consensus of opinion in regard to the fact that this hypertrophy is connected with the great activity of the lymphoid tissue in early life. This is a common defect among school children, and its early recognition and treatment is extremely desirable for pedagogical as well as hygienic reasons. An operation in childhood is usually successful. The adenoid growth interferes with the nutrition of the brain, and results in linguistic defects, mental confusion, dullness, and often in mental irritability and perversity as regards school discipline. A special form of inattention due to this defect has been distinguished, called *aprosechia nasalis.* Many investigations of this defect among school children in different countries have shown a number of cases, varying from perhaps 5 per cent to 25 per cent or 30 per cent. Tests for this defect should always be included in the physical examination of school children. For further details see the article on the Hygiene of the Nose. W. H. B.

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ADJUSTMENT. — This term is often used as a synonym for Accommodation and Adaptation (*q.v.*). Strictly speaking, the term denotes the result of equilibrium which may be effected by either of these processes. Adjustment to society is at present a favorite way of conceiving the end of education; while containing an obvious truth, it is in danger of being interpreted in the direction of class education, *i.e.* fitting individuals to fill specific predetermined positions in the social order, instead of securing to them such a development of their own powers as will enable them to make their own adjustments in a changing social order. Where economic and social changes are as great and rapid as they are in contemporary life, it is disastrous to try to fix by education the forms which the social adjustments of individuals shall take. A chief cause of incompetency and poverty often lies in the fact that individuals are so educated only to a special line of activity which is transformed or even eliminated by social progress. J. D.

ADLER, GEORGE J. (1821–1868).—A German-American linguist and lexicographer. He was born in Leipzig, and at the age of twelve came to New York. After graduating from New York University in 1844, he became professor of German in that institution (1846–1854). For the last eight years of his life he was insane. His German-English Dictionary, the first edition of which appeared in 1848, is still used. He also published a German Grammar (New York, 1868), and other textbooks, a lecture on the *Poetry of the Arabs in Spain* (New York, 1868), an essay entitled *Wilhelm von Humboldt's Linguistic Studies* (New York, 1868), and a translation of Fauriel's *History of Provençal Poetry.*

ADMINISTRATION, SCHOOL. — This topic covers the work of so many different officers and so many different types of schools that the subject has been treated under a number of heads. For the state aspect of the work see STATE SCHOOL ADMINISTRATION, and STATE BOARDS OF EDUCATION. For the county aspect of the work see COUNTY SYSTEM OF SCHOOL ADMINISTRATION, COUNTY BOARDS OF EDUCATION, and RURAL SUPERVISION. For the city aspect of the work see CITY SCHOOL ORGANIZATION, CITY SCHOOL SYSTEMS, BUSINESS MANAGER, CITY BOARDS OF EDUCATION, and the articles on the various city school systems, to be found under the cities, as ALBANY, BUFFALO, etc. Other articles relating to all phases of school administration, state, county, city, and district, are BOARDS OF EDUCATION, SUPERINTENDENT OF SCHOOLS, SUPERVISORS AND INSPECTORS, EXAMINATION BOARDS, APPORTIONMENT OF SCHOOL FUNDS, AND CERTIFICATION OF TEACHERS. RURAL SUPERVISION deals with the work of county and district authorities. SCHOOL FUNDS, and TAXATION FOR EDUCATION, deal with the financial aspect of administrative work. For administration in Europe see under the various national systems. E. P. C.

ADMISSION, EXAMINATION FOR.—See COLLEGE ENTRANCE EXAMINATIONS and COLLEGE ENTRANCE BOARDS.

ADMISSION OF PUPILS, AND THEIR DEPARTURE FROM THE SCHOOL.—See SCHOOL CENSUS; COMPULSORY ATTENDANCE; ELIMINATION OF PUPILS; RETARDATION OF PUPILS.

ADOLESCENCE AND YOUTH. — The period of life included within these terms extends from pubescence to the attainment of relatively complete maturity. The age varies, being earlier in hot climates than in cold. In temperate zones, and especially in America, it usually extends from the fourteenth to the twenty-fifth years for boys and one or two years earlier for girls, but Crampton found a range of four years in the attainment of pubescence.

Physiologically the general characteristic of adolescence is more rapid growth of all parts of the body than at any time since the first year of life, most rapid in the earlier stage and lessening toward the end. This usually begins at 11 or 12 in girls and about two years later in boys, and its culmination is passed by 17 or 18 years. Except from 11 or 12 to 14 or 15 years, boys excel girls slightly. Growth in height precedes growth in weight, and is usually complete by 18, while growth in weight may continue to the fiftieth year or later. Not all parts of the body grow with equal rapidity or proportions, but as yet statements as to details must be especially tentative. The bones begin to grow rapidly just at puberty, and after the twelfth year in girls and fifteenth in boys the trunk skeleton increases more than the legs, so that sitting height becomes greater relative to total height. Between the twelfth and nineteenth years the thorax increases from .62 to .76 meter, and the skeleton is completed in many minor details. In girls especially the pelvic region is modified, the iliac arches broaden, and various bones unite, to give better support and balance. This growth is probably not complete before the twenty-fifth year. Coincident with this the hip measure increases relatively more for girls than for boys. The length and width of the face increase especially between the twelfth and sixteenth years, but the skull changes little, though there is a very slow increase both in length and breadth, as well as a closing of the sutures. The muscles probably grow more rapidly at this time than do any other tissues, but we know little of the details. The main growth in bulk is completed by the nineteenth year, but for some time afterwards the working power increases. They constitute by weight 43 per cent of the body and are estimated to expend about one fifth of its total energy. The cortical centers for the voluntary muscles cover most of the lateral brain zones, so that training of the voluntary muscles is brain-building. Involuntary muscles form the heart and digestive tract. Muscles thus are a highly significant factor in determining both physical and psychical efficiency, and their proper development at the period of most rapid growth is one of the most important tasks. In general, motor development seems to proceed from fundamental to accessory, the finer accessory movements and control being pretty well developed by the eleventh year. But with puberty there comes a period of lessened motor control, — usually placed during the twelfth year for girls and thirteenth for boys, — in which the adolescent should not be expected to do as fine work as before, and himself has the inclination to activities demanding strength rather than delicacy. The demands frequently made at this time upon boys, and still more upon girls, probably lay the basis for various forms of nervousness, automatisms, and tics. Hall believes that at this time the basal muscles of legs, .back, shoulders, heart, lungs, and chest should be developed, and the finer ones involved in reading, writing, and school work generally, should be somewhat relieved, at least to this extent, that the adolescent should not be expected to improve in any of the manual aspects of his work, nor blamed if he retrogrades, but should be given just enough practice so that in the development of accessory muscles, which comes a year or two later, he will not have to form new habits again. The chief desideratum here is not to acquire bad habits by over-forcing and not to lose through disuse the good habits already formed. But in the last half of the teens, and still more in the early twenties, the love of skill develops, the accessory muscles should be trained to the highest degree, and the youth raised from the blundering apprentice to the master workman.

The heart in its growth keeps a constant proportion to the total bodily weight, remaining about .48 per cent of it, but at adolescence the frequency of its beats seems to lessen, while their strength is greater. The arteries grow less relatively than the heart, so that at adolescence the blood pressure is greatly increased. The ratio, as given by Truslow, of the volume of the heart to the width of the ascending aorta is 56 to 20 before puberty and 97 to 20 after. With this alteration goes a slight increase in temperature of the body, of about one half degree F. The number of red corpuscles reaches its maximum in the later teens, and specific gravity at about 14 for girls and 17 for boys. The lungs grow most rapidly in girls between the twelfth and fourteenth years, and in boys about two years later. By the fifteenth year the number of respirations is approximately that of the adult. While the brain is increasing slightly in weight at this time, its weight relative to that of the entire body is diminishing, that is, it does not form so large a percentage of the total weight as before. Kaes, with others, however, believes that after the seventeenth year the brain is increasing greatly in complexity, and with Vulpius he places the development of the middle layer of the cortex in the later teens, the parietal and central regions developing first, then the temporal, and lastly the frontal. This growth probably lasts at least until the fortieth year. It may also be that the two thirds of the brain which Flechsig believes to be in general unconnected with sensory and motor centers, as well as the highest level described by Hughlings Jackson, develop at adolescence, though this is only theoretical. As yet very little is known about the development of the digestive tract, glands, and kidneys, though the composition of the urine is greatly modified at adolescence. Liver growth is probably relatively complete at 15, but the pancreas and spleen seem to continue to grow until the fiftieth year or later. The salivary, sebaceous, and sweat glands increase in activity, while the thymus atrophies. Fatty tissue diminishes in boys and increases in girls.

The sense organs also undergo characteristic alterations. Carman and Gilbert believe that the pain-pressure sensibility lessens at adolescence, but their experiments do not seem to eliminate the factor of greater endurance of pain by the adolescent. Their conclusions as to pain-pressure, however, are indirectly supported by the fact that touch-discrimination lessens, because the dermal surface is constantly increasing while the number of tactile end organs remains constant. Hall notes in connection with this a touch hunger at adolescence, manifesting itself in the desire to scratch, rub, pinch, or even abrade the skin. The heightened activity of the sebaceous and sweat glands and the more rapid growth of hair, doubtless make the skin more the focus of sensations than before, and so lead to this increased attention to it. The tendency to skin eruptions at this time would have the same effect. There is also increased sensitiveness to temperature in the later teens. The adolescent's taste alters. The appetite is capricious, new likes and dislikes to food appear, but soon change. Animal food and decided sweets and sours are more desired. A craving for stimulants may appear. Fashion becomes a strong motive in regulating what is eaten, the adolescent often forcing himself to eat food highly disagreeable, if he believes that it is the correct thing. Smell also becomes more acute at puberty, and seems to be closely connected with the development of the sexual instinct, but sufficient returns on this point are lacking. The love of perfumes, especially rather strong ones, is characteristic of adolescence. Sight and hearing will be discussed later, since they are closely bound up with the intellectual characteristics of adolescents.

These investigations are few and unsatisfactory, and it is even impossible to say at present how far the greatly heightened sensitiveness to all sorts of stimuli is due to the further development of the sense organ and how far to the growth of brain centers. Further studies are greatly needed here. Whichever it may be, there is no doubt that the adolescent now as never before is open to the broadening influences of new stimuli, from the grossest to the most refined. This is the decisive age for fixing taste in both its literal and figurative senses. Food, skin, and temperature habits, to say nothing of interests in sounds, colors, and forms, receive now their life trend. Even if the early environment of the child has been unfavorable, it can be largely counteracted, if now the adolescent is surrounded by and chooses for himself the true, the beautiful, and the good, because his brain is still plastic enough to admit much modification. Hence we so often see in high schools transformations of children from poor homes who have come under the influence of some teacher or comrade with better æsthetic or hygienic standards. Equally we often see a perverted taste spread through a school, for adolescence is preëminently the time of fads, of purely artificial social judgments on everything in life, from cooking a beefsteak or wearing a tie to reading and pictures.

Psychological and Sociological. — The rapid growth of the body already roughly indicated is paralleled by a similarly rapid psychic growth, which perhaps manifests itself most characteristically in alterations of moods, and especially in a heightened sense of self. The adolescent longs for excitement, contrast, movement, psychically, just as his body longs for exercise and tensions. So, instead of a steady effort, he tends to spurt, periods of intense work being followed by complete idleness, with long hours of sleep. Moods rule the youth, dejection so deep as to suggest genuine melancholia being followed by equally great elation. Thoughts of suicide are common, but alternate with dreams of greatness. Both these are undoubtedly motivated by the highly increased sense of self, which is itself pushed into the foreground by the many sensations accompanying the bodily growth. So conceit and humility in their most exaggerated forms may be seen in adolescence, as well as an *amour propre* which shows itself in great sensitiveness to insults. All the social instincts come to the fore, and the youth alternates from extreme individuation to mere slavishness in following his mates; from quixotic generosity to selfishness; from the highest ideals of social self-sacrifice to absurd notions of his rights. The deepest and most far-reaching alteration is naturally in the feelings toward the opposite sex, which probably is responsible for many of the other alterations of both feeling and thought, not ordinarily recognized as sexual. In the early teens many students believe that there is first a tendency between the sexes to withdraw from each other's company, though this theory still lacks any adequate confirmation. There does, however, seem to be at least a period when both boys and girls complain of the other sex, the girls of the masculine coarseness and roughness, the boys of the feminine softness and foolishness. Following this, at about 15 years, the opposite sex becomes excessively attractive, so that it is highly probable that at this period the desire to appear attractive to the opposite sex is an important motivating influence in the adolescent. This is of course much covered to the youth's own consciousness, and is often the last thing he would willingly admit. In boys it manifests itself especially in the showing-off instinct, which seems especially stimulated by the presence of girls. Both girls and boys develop pronounced tastes with regard to eyes, hair, voice, teeth, etc. Girls, though they do show off, tend more to the development of reserves, taking the rôle of judges or choosers of those who please them, thus favoring the selection of some manly characteristics and the atrophy of others, and so finally shaping the youth to their desires. The whole process of selection and mating normally reaches a climax between 20 and 25 for women and perhaps five years later for men, when what Hall calls nubility or the marriageable age is attained.

But at the same time that the opposite sex becomes so attractive, friendship and hero worship also deepen, and the social instinct is enlarged in all directions. Before pubescence games and plays are largely competitive; after it team work is the most marked characteristic, and with it, the gang and the club appear. While the youth is even more egoistic than before, while he is excessively self-conscious and perhaps aggressive toward the opposite sex, he also lays aside his personal likes and dislikes to work with his team and his school, and adopts almost slavishly the fads and frills dictated by those whom he elects as his *socii*. He now develops pride in his family, class, city, and nation, and not only civic and national patriotism can be most effectively taught, but also love for humanity.

Closely connected with the social instinct is the religious instinct. From the earliest times the entrance to adult life has been marked by rites and ceremonies designed to test the mettle of the adolescent and to prepare him for the duties of life. Among savage peoples these are usually severe tests of the power to endure pain and overcome fear. In Greece the boy was put through a training of years in serving the state, and in Rome the same was true. The medieval youth of noble descent from 14 to 21 served as squire, and at 21 was knighted at the end of long ceremonies of fasting and watching. The Jews also had and have a careful training for adolescents and a ritual used when the boy assumes responsibility for his own acts. Among modern Christian nations these rites are perpetuated only in confirmation, which usually occurs at between 12 and 15 years, and has assumed a wholly religious character. The enlargement of the social sense occurring at adolescence is inevitably accompanied by a deepening of the moral and religious natures, a questioning of one's relations not only to society, but to the universe itself and its Final Cause. The irreligious adolescent is abnormal. The particular form which his newly awakened instinct will take will largely depend upon his *milieu*, and the age of culmination also varies considerably. Most authorities agree, however, that between 16 and 17 the largest number of conversions is recorded for boys, and a year or two younger for girls. There is still some uncertainty in the curves, but it seems probable that this period is followed by one of backsliding, and that at 20 interest in religion again culminates, this time on a more reasonable and less purely emotional basis than at first. The normal development of this instinct is obscured by the artificial forcing of the religious sense and of conversion still too prevalent, which is likely to cause the later backsliding. We can hardly suppose that, if the original conversion were a normal, natural one, the painful reconstruction later would be necessary in so many cases.

Intellectual. — The intellectual characteristics of adolescence are equally marked, and are motivated by the underlying feelings and the rapid growth. Let us first consider those most closely connected with the heightened sensory and motor development. In the early teens probably hearing is over-acute for a time, making the adolescent keenly sensitive to voices, inflections, etc. At the same time the temporary loss of control accompanying the change in voice makes girls and especially boys disinclined to sing as much as before. Not infrequently the general awkwardness of this age leads to disliking instrumental practice, the boys and girls feeling their lack of control and their inability to express what perhaps they appreciate deeply. At present studies are entirely lacking to show what sorts of music most appeal to adolescents. We can only say in a general way that rhythm is loved, and that the passion for music seems to decline somewhat after the sixteenth year. We may also add that, as with other forms of art, appreciation is farther beyond expression now than at any other time, and that to demand too much expression now may affect the love of the art disastrously.

This has been better worked out in drawing. Studies of children's drawings, especially those of Barnes, show that from 12 on, drawing becomes distasteful, largely because children become conscious of their defects, *i.e.* can appreciate better real art. At 14 or 15, with some children, the love of drawing may again increase, and with a few it may rise steadily, ending in artistic creation. Gilbert found that the interest in and accuracy of form perceptions begins a new increase between 15 and 16 years, and that the maximum number of letters grasped at one glance continues to increase through high school and college. These facts also would indicate that between 12 and 15 years, appreciation should probably be emphasized rather than expression, expression having its turn when motor control is better. The color sense seems to be fairly developed in girls by the eleventh year, but in boys not until the seventeenth. At adolescence both sexes crave strong color stimuli and have decided likes and dislikes.

Manual and industrial training problems should be solved by a knowledge of normal growth, but as yet we know too little of the details of adolescent muscular growth. Boys and girls nearly double their dynamometer right-hand grip between 11 and 16 years; finger and wrist control, as indicated by tapping, is on the rapid increase at 16 in boys, while it declines from 12 to 13 for boys and from 12 to 14 for girls. Judging of lifted weights decreases in accuracy at between 15 and 16 for both boys and girls, but then begins to increase again. Power to endure muscular fatigue increases greatly from 12 to 18, with maximal increase from 14 to 17 for boys and from 12 to 14 for girls. From 12 to 14 both boys and girls improve little in reaction times; from 14 to 16 they improve steadily, and then gain little the next year. Obviously, such scattered experiments, which also show deviations in the results obtained by different observers, are a totally insufficient basis for any scheme of motor education. At best, if taken in connection with the other facts of general growth, they seem to indicate certain danger points or tendencies in present methods. The youth tends to exercise of the larger muscles, but much of our industrial education necessitates the use of the finer muscles in handling tools, and perhaps bad attitudes and the steady use of some sets of muscles while others are neglected. The same thing is true of manual training, which neglects the trunk and leg muscles as a rule, while it may develop the hand more than should be done at this age. Sloyd aims at a more all-round development, but it too trains only the hand, and neglects much material even for that. The best all-round development is obtainable from the varied and outdoor occupations of a farm, and next to that, Hall declares that we can find it in some of our institutions for negroes, Indians, and juvenile delinquents.

Gymnastic training has great opportunities at this time, not only in counteracting any bad effects from industrial training, but in rousing youth to a tremendous enthusiasm for perfect bodies. The love of exercise, so strong at this age, may be made the impetus for the best possible regimen — cold baths, swimming, walking, temperance in eating, etc. Not only this, but the increased body consciousness of adolescence leads naturally to a strong interest in the structure and functions of the bodily organs, so that physiology and hygiene — in which sex hygiene should not be neglected — can, if properly presented, be one of the most fascinating subjects.

The love of exercise and of manipulation, together with the heightened sensory activities, give the basis for new interests in nature. The rapidly increasing brain connections make possible many new associations with their effects upon imagination and reason, so that for the first time there is now a possibility of the youth seeing the universe as a universe, and feeling it as divine. In the later teens most youths and maidens love to think of infinity both in space and time. They try to picture it, and become filled with the sense of their own littleness and the vastness of the universe. Most often these reflections attach themselves to the heavenly bodies and the sky, toward all of which the feelings are greatly deepened at adolescence. Now the sun, moon, and stars become foci for all sorts of symbolism and fancies, sometimes sentimental and sometimes mythological and religious. Clouds also become, in Ruskin's opinion, one of the greatest stimulants to imagination, as well as the most beautiful in their color and form and variations. The wind now echoes the restlessness of the youth, and the sea attracts him with its suggestions of eternity. If it really is true that nature appeals to the youth primarily in this poetical way, then it is little wonder that he has no love for high school and college science. To turn from the lovers' moon to the burned-out, cold, dead moon of science; from Shelley's cloud to a mass of cold aqueous vapor with a long Latin name; from a glowing opal symbolic of faith and hope to a dry record of geologic ages; from a heaven full of heroes, hunters, and maidens to estimates of the lengths of time necessary for a ray to reach us from one of them, all this must kill the spontaneous interest in nature and at the very best substitute for it utilitarian motives. Similarly with animate nature. The love of flowers increases markedly at adolescence, and through the care of them and study of their life histories the fundamental facts of reproduction could be naturally learned. Interest in animals also has another increase at about 14, but an interest in them in the concrete.

That is, high school youth are not developed enough to understand or to assimilate scientific exactness and details. They tend both to poetical views and to applied science, and so, *e.g.* physics at this time should be closely connected with making toys and machines to illustrate its laws; botany to gardening and forestry; astronomy, etc., to weather on one side and to poetry and mythology on the other. Hall gives four stages in the normal adolescent development toward nature: (1) the sentimental, with a love of myth, poetry, and religions of nature; (2) love of popular science and the lives of inventors; (3) interest in industrial processes on a larger scale; (4) pure science, a stage seldom reached before the end of the college course.

Adolescent interests in literature and language are closely akin to those in art. Most youths seem to pass through a period of inability to express themselves in words, like that in drawing. This does not indicate lack of interest in words, but rather a sense of their own shortcomings. So Williams, Conradi, Bullock, Henderson, and Kirkpatrick all find a great increase in the reading curve at adolescence, culminating at 14 or 15, between the sixth and eighth grades, and then steadily falling. With boys stories of adventure, travel, and biography culminate in the eighth and ninth grades, and fiction at 11 for both sexes, but there is much variation both in the sort of reading preferred and the age when any one sort is most enjoyed. Judging from lists of preferred books, classic writers are not the favorites, but this may be due to the fact that they are inaccessible to youth.

How far the study of literature should deal with details of style, grammar, and the formal aspects of the subject we cannot say at present. It is suggestive, however, that the few studies made indicate that the love both of slang and of precision in the use of words culminates at about the same age as the reading passion. Studies of reading also indicate that a considerable percentage of youth at this time spontaneously set about enlarging their vocabulary — indeed, the use of slang seems to be a crude attempt in this direction — and study the dictionary for new words. Sentences also become more complicated at this time. All this may indicate that a study of rhetoric is now in place, though probably not of grammar. Rhetoric also, in dealing with figures of speech, may set free the riches of imagination hidden in much of our daily speech and too often never seen by those who use it. An attentive consideration of the literal meanings of such words as "spirit," "animate," "lady," not only aids expression, but greatly quickens imagination, thought, and feeling. Again, the study of foreign languages may and should aid in all these ways, but it can do so only if the root meanings of words and the elements common to various tongues are emphasized and the grammatical aspects somewhat left in the background. There is a keen delight in discovering a word common to four or five languages, with the variations of meaning which it has attained in each that has nothing in common with its parsing and declination.

The expressive side of language, *i.e.* composition and theme work, is again a much mooted one, and we lack returns upon which to base authoritative recommendations. This much, however, seems probable: Before adolescence far more oral expression should be cultivated than is now the case, and during the time when the reading craze culminates, expression should be encouraged, but not forced, nor too severely criticised for its crudities. Young people not infrequently try to write stories, novels, and poetry, but they abhor the usual theme subjects, and are too dependent upon their moods for inspiration to submit well to set times for composition.

Of historical interests we can say still less, and of mathematical practically nothing. Mrs. Barnes' studies seem to indicate that even at 15 interest in the truth of any narrative is very slight, while interest in name and place is strong throughout. Miss Patterson concluded that the historical sense, as shown by understanding what a date means, is slight up to the age of 12, and that before that age history should be biography and story, while after that concrete and rather complete pictures of any given time should be presented.

Hancock's returns indicate that ability to reason in arithmetic increases greatly between 13 and 15, while Lindley found the interest in arithmetical puzzles culminating somewhat after this age. But we have nothing at all as yet to indicate the growth of interests in geometry and algebra, and so can only note our ignorance. Indeed, the insufficiency of our knowledge of all the intellectual characteristics of adolescence should be very evident from the above account. Until much more detailed and exact material is at hand it is both illogical and wasteful to make over our high schools. That they need to be reformed every one will admit, but until the adolescent mind has been much more closely studied, any reform is likely to be a makeshift as unsuited to the real needs of youth as the present system.

A. E. T. and G. S. H.

Hygiene of Adolescence. — The hygiene of adolescence differs little from the pedagogy of adolescence. One must regard the fundamental principles of school hygiene, and adapt education to this stage of development. It is not always easy, however, to determine an individual's stage of development. The adaptation of education must be to physiological age rather than to chronological age. Dr. Crampton and others have shown such great individual variations in growth and development that there appears to be no direct correlation between physiological age and age in years.

The characteristics of the period of adolescence have been described above. It is the period of rapid physical change and rapid mental development. It is a time of nervous and emotional instability; and modification of function and habit is now easy. It may be specially characterized as a time of functional development and readjustment, as shown obviously in such changes as these occurring at the advent of puberty, for example, the change of voice, and especially the physical characteristics of sex. On the mental side it is a time of many potential and actual interests, and the youth often exhibits peculiarities of behavior and may hold bizarre and erratic opinions. In a word, the advent of puberty is a period of increased rate of physical growth and of increased vitality, as shown apparently by Key's investigation, which indicated that correlated with the increased rate of growth was a decreased percentage of chronic disease, and by Dr. Hartwell's study of the death rates of Boston children, which indicated that this period of increased rate of growth is a period of decreased mortality. Further the studies of Crampton indicate that after the physiological changes of puberty have occurred pupils are better fitted to do school work, while those who have not reached this stage of development are at a disadvantage, although of the same chronological age. Although the later period of adolescence is not characterized by such marked changes as the early period of puberty, it is throughout a period of relative instability and of rapid change and development.

As might naturally be supposed, such a period of instability and of rapid development is not only the opportunity for educational and moral development, but liable in certain respects to be a time of especial danger to health. Certain physical diseases and certain psychoses (*q.v.*) often occur as incidents of this development. While serious symptoms may appear, the prognosis is usually favorable, and there is good hope of improvement or recovery if a thoroughly hygienic environment can be insured.

To take a concrete illustration, Dr. Frances Berry of London has reported on some 1580 cases of girls in the elementary schools of London, of ages ranging from 11 to 15. The examination included a test of the urine with the surprising result that 10 per cent of the cases showed evidence of albuminuria. Apparently this symptom was usually an incident of development. In most cases, although albumen was more or less permanent, no evidence was found of any detrimental effect on the general health, and only a small percentage of these girls appeared to be in delicate health; and after 16 or 17 years of age, the albumen tended to disappear in a considerable proportion of the cases.

Such symptoms, which would be serious in case of adults, and likewise cardiac disturbances and sometimes hysterical neuroses, are often to be looked upon merely as incidents of development; and it is the gravest mistake to treat such cases in the same manner that similar symptoms would be treated in the case of adults. The chief dependence should be upon furnishing a healthful environment and an opportunity for the individual to outgrow the trouble.

Especially important for the teacher is a word of warning against the danger of mistaking incidents of development at this period for signs of degeneration. Just as there are many physical disorders, cardiac disturbances, and the like, incident to development at this period, in which the prognosis is favorable, and such neuroses should not be treated as the same symptoms are in the case of adults, so there is good hope of recovery from all sorts of mental and moral perversities and aberrations if they are treated as incidents of development and not as stigmata of degeneration. With suitable environment and education, sanity and morality are both likely to develop, whereas a diagnosis of incipient insanity, or degeneration, or of criminality, followed by drastic punishment, especially arrest and imprisonment, is liable to develop a real pervert or criminal. In such cases, as with all adolescents, what is usually needed is the example and companionship of friends of normal character and an environment which gives the largest opportunity for vigorous expenditure of energy, for activity in many lines, and the development of manifold interests, rather than instruction however thorough or preaching however eloquent.

Many investigations have shown that the physical changes incident to puberty come one or two years earlier in case of girls than in case of boys. Thus the girl of 13 or 14 is likely to be taller and heavier than the boy of the same age, and in general to be both physically and mentally more mature. Hence it is argued by some that in coeducational institutions like the American high school, where girls and boys have the same tasks and are intimately associated, although later there may be too great demands on the girls, there is danger at this period of overpressure on the boys because of the stimulus coming from girls in the same classes who are more mature; and thus an unwholesome precocious development intellectually and morally is liable to occur. This problem should be further investigated, but meanwhile from the point of view of hygiene it seems desirable that whether coeducation prevails or not there should be at this period a differentiation in the education of the two sexes.

Especially important for hygiene are not only the physical characteristics of this period, but also the development of the emotional life, the awakening of manifold interests and tendencies, the nascency of the altruistic impulses, and the general mental awakening. This period presents the great opportunity for education, but with this opportunity great danger is connected, and great care is required to preserve the mental as well as the physical health. Mental hygiene is of vital importance. Among the habits of health that should be developed at this time are three great groups, as follows: 1st, normal reactions to feeling; 2d, normal relations to society; 3d, proper mental balance.

Especially emphasized by hygiene is the need of developing at this period normal habits of reaction to feeling and emotion. The most important contribution to hygiene here is that made by psychiatry. Anything which interferes with the normal reaction to feeling, whether individual habit or social convention, is dangerous to the mental health. But on the other hand self-control is necessary in the interests of health as well as of morality. Psychology shows the kind of self-control that is normal. Self-control by repression seems always liable to be dangerous, but normal self-control consists in the inhibition of one form of reaction by a different reaction. More concretely, if it is necessary for the youth to control the reaction to feeling or emotion in one direction, this may be brought about by developing a habit of reacting in a different way. Among the manifold interests and impulses of this period some would bring upon the individual serious injury, physically, mentally, and morally, but here protection lies in the development of manifold interests and varied forms of activity. Every interest is in fact potentially a means of self-control, and psychology shows that the normal method of self-control is the inhibition of interest and impulse in one direction by turning attention to something else. Thus it is not a matter of indifference to hygiene what interests are developed. Among the habits distinctly conducive to health must be reckoned active interests in nature, in outdoor sports, in varied forms of manual work and skill, and the varied forms of artistic activity, in social life, and social institutions.

The period of adolescence is, as Rousseau long ago pointed out, the new birth of the individual in relation to society. And here again it is distinctly important for the mental health that social interests should be developed. Anything which tends to repress or arrest the social development of the individual is liable to be injurious, and it is a noteworthy characteristic of many borderline neuroses that the social relations and social interests are repressed or perverted.

Again, it is important for the health of the individual that a group of habits representing an adaptation to one's environment should be developed. This may be conveniently termed the acquisition of balance. The individual must find his own level, and apparently many cases of nervous disorder, even perhaps cases of *dementia praecox* (*q.v.*), may be ameliorated if not prevented by bringing about this individual adaptation, by decreasing the demands of school and society to a level that balances the individual's powers; hence the need of a better system of grading than that usually adopted and of more careful choice of calling than is frequently made.

The negative side of the hygiene of adolescence should be noted, although it is of less importance than the positive side. In the case of boys the avoidance of injurious habits, vice in its different forms; and on the one hand, excess in any form, or on the other, habits of indolence and inertia; and in case of girls, especially the avoidance of shock and the like, which are liable to cause hysterical neuroses. Suitable instruction should of course be given at this period in regard to morals and especially in sex hygiene; but teachers and parents should be warned not to substitute the easy road of instruction for the difficult one of training. W. H. B.

See articles on ADOLESCENCE; DEVELOPMENT; DEMENTIA; COEDUCATION; COEDUCATION, HYGIENE OF; HIGH SCHOOLS; and SEX HYGIENE.

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ADRIAN. — In 664 Deusdedit, the sixth Archbishop of Canterbury, died, and the priest Wighard (a pupil of the school in Kent founded by Augustine) was sent to Pope Vitalian for ordination as Archbishop. He died of the pestilence in Rome, and Vitalian thereupon offered the see to the Abbot Adrian (or Hadrian), an African monk in the monastery of Niridanum near Naples. Adrian refused, and suggested in his place first Andrew, the officiating priest of a neighboring nunnery, and on his refusal the monk Theodore of Tarsus, a monk of the Greek Church. Theodore was accepted by the Pope, and consecrated on March 26, 668; and on May 27, Theodore and Adrian set out for Britain with Benedict Biscop (*q.v.*) as their interpreter and guide. They went by sea to Marseilles and on to Arles, and were detained for some time by Ebroin, the Mayor of the Palace. King Egbert sent for them, but Adrian was still detained for a time, as Ebroin feared that he was engaged on a political mission that might affect Gaul. He was after some delay allowed to follow Theodore, and was at once placed over the monastery of St. Peter and Paul (St. Augustine's) at Canterbury which Biscop had governed until Adrian's arrival in the year 670. Probably these scholars brought with them the Manuscript of the *Acts of the Apostles* now at Oxford (Laud, Gr. 35). The school of Theodore and Adrian at once became famous. They taught the metrical art, astronomy, and ecclesiastical arithmetic, and " there are still living at this day (732) some of these scholars, who are as well versed in the Greek and Latin tongues as in their own, in which they were born" (Bede, E. H., IV, 2). Albinus, the disciple of Adrian, " who succeeded him in the government of his monastery, was so well instructed in literary studies, that he had no small knowledge of the Greek tongue, and knew the Latin as well as the English, which was his native language " (E. H., V, 20). A more famous pupil of Adrian was Aldhelm (*q.v.*), the first in the long line of English scholarship. Adrian's educational work was of prime importance in the history of English education. The school at Canterbury seems to have been under his control. Aldhelm (in his letter to Eahfrid: see *Correspondence of St. Boniface*) tells us that the scholarship of Theodore and Adrian routed and put to shame that of the scholars of Ireland: an exaggeration, but nevertheless a very significant exaggeration. Adrian assisted Theodore in his official perambulation of Britain. He was (says Bede) " everywhere assisted and attended by Adrian." Theodore died in 690, but Adrian lived on till 709 or 710, and was buried in the church of his monastery.

J. E. G. de M.

ADRIAN COLLEGE (Adrian, Michigan). — A coeducational institution, organized March 22, 1859, maintains a College of Literature and Arts, a School of Music, a School of Fine Arts, a department of Manual Training, a School of Theology, and a School of Business. Admission to the College of Literature and Arts is by examination or certificate from an approved high school; the School of Theology is open to college graduates or to "those intending to complete a college course." The other departments admit without examination. The seventy-four members of the board of trustees are elected by the General Conference of the Methodist Protestant Church. College fraternities at Adrian College have been established as follows: Sigma Alpha Epsilon, Kappa Kappa Gamma, Delta Delta Delta; the last two are women's societies. The college has five buildings, valued (1906), with grounds and equipment, at $175,000; the total annual income is about $20,000. The average salary of a professor is $700. There are twenty members on the instructing staff, of whom nine are full professors. The College of Liberal Arts enrolls 105 students. The student body has always included many prospective ministers. The Rev. Brayman William Anthony, D.D., is president.

C. G.

ADULT-SCHOOLS IN ENGLAND. — See Adults, Education of.

ADULTS, EDUCATION OF: In England.— Adult schools, for the education of men and women whose previous education had been neglected or who had no access to other forms of continued instruction, were in their origin closely connected both in England and Wales with the Sunday school movement (*q.v.*). In Wales the Sunday schools were from the first (1730) largely attended by adults as well as by children. In England the Sunday schools (largely developed through the influence of Robert Raikes (*q.v.*) and Thomas Stock of Gloucester in 1780) were mainly confined to children. The first adult school in England was opened at Nottingham in 1798 by William Singleton, a Methodist, aided by Samuel Fox, a tradesman belonging to the Society of Friends. It was originally started for the instruction of working women, but a men's class was soon added. It has continued without lapse to the present day. Great impetus to the establishment of adult schools was given by the discovery, on the foundation of the British and Foreign Bible Society (*q.v.*) in 1804, that a great number of the poorer classes could not read. Adult schools were in consequence established at Bristol in 1812, chiefly by the efforts of William Smith, a Methodist, and with the aid of members of the Society of Friends. The movement soon spread to other parts of the country — Plymouth, London, Yarmouth, Sheffield, Brighton, Buckinghamshire and Berkshire, Ipswich, York, Leeds, and Birmingham. These schools were an outcome of Evangelical philanthropy, and, though providing secular instruction, were religious in their associations. Parallel with these, but of independent origin, were classes in scientific and civic subjects, arranged for working upon a secular basis and without any religious connection. These began in Birmingham (1789) and in Glasgow (1796). Spreading to Edinburgh, Liverpool, London, and Manchester, they developed into the Mechanics' Institutions (*q.v.*). Thus the English adult schools, which were an important factor in the social movements generated by the Industrial Revolution, developed in two separate groups, the one deriving its ideals from the Evangelical movement, the other from political and industrial democracy, the growth of which was stimulated by the French Revolution.

In 1845 the former group of adult schools, which had been falling into decay, was revived and greatly extended by Joseph Sturge and William White of Birmingham. Their labors led to the establishment of the First-Day Schools' Association of the Society of Friends. Adult schools, largely, but not exclusively, in connection with the Society of Friends, are now one of the most important educational agencies among English workingmen, especially in the Midlands and the industrial districts of the North.

The Mechanics' Institutions spread rapidly from 1824 to 1848, with the active assistance of Henry Brougham (*q.v.*) and Edward Baines (*q.v.*), but they relied too much on lectures unaccompanied by class instruction, and became largely identified with the class of small tradesmen whose political and social ideals were uncongenial to workingmen inspired by socialistic propaganda. William Lovett and other Chartists published in 1837 a scheme of national education including colleges to be open every evening to adults of both sexes for mutual instruction and all forms of higher and recreative education. The first People's College was established at Sheffield in 1842 by the Rev. R. S. Bayley, an Independent minister. The program of the Sheffield People's College suggested in 1853 to Frederick Denison Maurice (*q.v.*) and his Christian Socialist friends (among whom were Charles Kingsley, Edward Vansittart Neale, Thomas Hughes, John Ruskin, Dr. F. J. Furnivall, Dante Gabriel Rossetti, and others) the establishment of the Working Men's College in London. The plan of this college (which was followed by more evanescent institutions in Manchester, Liverpool, Oxford, Cambridge, and elsewhere) brought the spirit of the older universities, with its regard for corporate life and for a religious element in higher education, into fruitful union with the more secularistic movement among Socialist workingmen. Its work effected the union between three separate educational traditions — the Evangelical, the Tractarian, and the Socialistic, the latter having derived much of its force from the propaganda of Robert Owen (*q.v.*).

In 1851 the English government first made pecuniary grants to evening schools in connection with elementary day schools. These grants were increased in 1855 and 1858, and were supplemented by further grants from the Science and Art Department in 1859 and 1861. In 1893 (in consequence of recommendations made by Lord Cross's Commission of Inquiry into the work of Education Acts, 1886), Mr. Arthur Acland, then Vice-President of the Committee of Council on Education, introduced a new code for evening schools which encouraged by grants the attendance of students over twenty-one years of age, and introduced a liberal curriculum of civic and general education in evening classes. The government grants, given through the Science and Art Department, had in the meantime stimulated evening classes in scientific and technical subjects. In 1883, largely through the exertions of Mr. James Bryce, an Act of Parliament appropriated money belonging to obsolete charities in the City of London to the establishment of Polytechnics in different parts of the metropolis. These institutions combine technical and general education with collegiate life and popular forms of recreative instruction. They are the outcome of an experiment made by Mr. Quintin Hogg, who converted at great expense a derelict place of popular scientific instruction and amusement (the Regent Street Polytechnic) into a social and educational Institute for Young Men. The movement had also been stimulated in 1882 by Sir Walter Besant, who, in his novel, *All Sorts and Conditions of Men*, described a plan for a Palace of Delight for the East End of London. There are now in London twelve polytechnic institutes, which are powerful factors in higher adult education in the metropolis.

In 1889 the Technical Instruction Act empowered the County and County Borough Councils (established in 1888) to expend local rates upon technical education. Large additional funds were made available for this purpose by the Local Taxation (Customs and Excise) Act (1890). These acts, supplemented by the Education Act (1902), have given a great stimulus to adult education throughout England and Wales. At first this movement was almost exclusively technological, but of recent years there has been a rapid increase of interest on the part of workingmen in the development of civic and liberal education through evening classes for adult students (men and women). At the present time, out of every 1000 of the population in England and Wales, about 23 persons voluntarily attend some form of evening class on week days. Several agencies have been influential in the development of this movement, *e.g.* the university extension system, the National Home Reading Union, the Young Men's Christian Association, the Recreative Evening Schools' Association, and (during the last few years) the Workers' Educational Association. The latter is in close alliance with the universities, and is rapidly developing tutorial classes in which higher instruction in history and economics is being given by university teachers to small groups of workingmen and women, with remarkable results.

M. E. S.

In America. — Beyond some efforts for negroes and foreigners, little adult education in America has been directed toward the removal of illiteracy, as was the case in England. A wide variety of private, philanthropic, and public schools have arisen, having as their object the special or further education of adults. The special types of this adult education will be discussed under the following heads: —

UNIVERSITY EXTENSION; CHAUTAUQUA MOVEMENT; SUMMER SCHOOLS; MECHANICS' INSTITUTES; Y.M.C.A. and Y.W.C.A.; CORRESPONDENCE SCHOOLS; EVENING SCHOOLS; CONTINUATION SCHOOLS; COOPER UNION; LYCEUMS; LECTURE SYSTEMS, etc.

An examination of these agencies will show that four distinct types of education have been involved in them. In some the aims have been mainly practical, or vocational, as the mechanics' institutes and correspondence schools; in others civic training has been a controlling object; in still others a combination of cultural and civic training has been sought, as in the lyceums, Chautauqua movement, and university extension. Some of these types of adult education have approximated the nature of clubs in that they have provided library facilities and opportunities for physical exercise.

For detailed discussion see topics referred to above.

Adult education forms an important part of the educational work of one other European country, namely Denmark. For this, see DENMARK, EDUCATION IN.

In Germany similar work is done largely by the type of schools termed CONTINUATION schools (*q.v.*); see also the article on GERMANY, EDUCATION IN.

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ADVENTURE SCHOOLS, PRIVATE. — Schools opened by private persons as a speculative investment. This type of school has had a history almost as continuous as that of educational institutions. Wherever there was an insistence by any authority — church, state, or municipal — that no school should be opened without a license, private schools were sure to be found. After the Church had lost its power to license teachers this devolved to the towns, which guarded the right quite as jealously. Germany is perhaps the single instance where state license is universal; where private schools are opened it is necessary that the teachers have at least the same qualifications as those in the state schools. The *Winkelschulen* (*q.v.*) and dame schools (*q.v.*) are the main types of private adventure school in the elementary field; until recently the kindergarten schools were entirely in private hands. The rise of state intervention in education, the new public interest in and establishment of free schools, have largely done away with private adventure in elementary education. In the field of secondary education the private adventure schools have played a very important part, particularly in Great Britain and America. In Great Britain the private schools are modeled almost entirely on the great public schools, while in America they serve to satisfy class interests. A new scope has been found by the private adventure schools as centers of experimentation and reform. In this direction there is undoubtedly room in the educational field for private schools. The necessity of competition as well as the development of public intelligence in education must gradually weed out those private schools which place the financial above the educational interests, while to these factors a certain amount of governmental inspection and restriction will serve to regulate what seems to be a public need and at the same time to do away with the abuses which Dickens pilloried.

See ABECEDARIÆ; ACADEMIES; BOARDING SCHOOLS; LANDERZIEHUNGSHEIME; PRIVATE SCHOOLS.

AEGROTAT.— Literally, *he is ill.* There is a practice at Oxford and Cambridge universities of granting a degree to a candidate who presents himself for honors in a nonprofessional subject, and is unable to complete the examination through illness. If the papers which the candidate has already completed approach the requisite standard, he is granted a degree with honors. Otherwise the authorities may reserve the power to themselves of either granting an ordinary degree or permitting the candidate to receive the ordinary degree only after taking a part of the necessary examination.

ÆLFRIC.—(*c.* 940–1006.) Schoolbook writer and abbot. Ælfric's life was wholly uneventful. All that is known of it is derived from his own writings. He "spent," he told the monks of Eynsham, "many years in the school of Ethelwold, the venerable priest who taught many for their good." Ethelwold became Bishop of Winchester and *c.* 962 turned out the secular canons of the cathedral, replacing them by monks, except such, among whom appears to have been Ælfric, as would become monks themselves. Ethelwold's successor, Ælfheah, sent Ælfric to Cerne Abbey in Dorsetshire, where in 994, he wrote or translated his Homilies or Sermons on the Saints' Days, one of the chief Anglo-Saxon books we possess. In 996 he composed the Lives of the Saints, a translation from the Latin. Between those dates, he wrote a Latin grammar and glossary in English, chiefly, as he says, "excerpts from the smaller and larger Priscian." "I know many will blame me," he says, "for having occupied my time with such small matter as turning the art of grammar into English, but I intend the lessons for ignorant small boys, not for their elders." If any one blames his translation, they may: "I am content to do it as I learnt it in the school of Ethelwold." The grammar is chiefly interesting philologically. The colloquies which were seemingly intended to accompany it as a First Latin Book are a Dialogue in Latin with an interlinear literal translation in English, for the author never calls it Saxon, intended to provide a copious vocabulary of all words in common use. For this purpose the boys are made to belong to every occupation and questioned about their business, — plowboy, shepherd, cowherd, huntsman, fisherman, merchant, shoemaker, salter, baker, cook, smith, falconer, woodwright and oblate in a monastery. Many of the words would puzzle the best-read scholar of to-day, for the vocabulary was wanted for use in everyday life. As the boys put it, "We ask you, master, to teach us to speak Latin," not to read it or write it. Highly interesting is the account each gives of his life. At the end, they discuss which occupation is the highest and most necessary, and a "counsellor" is introduced to sum up the discussion. He decides formally in favor of the monk, but really in favor of the plowboy, as agriculture was the foundation of society. But when each claims that his trade is equally necessary, it is allowed that each does well who does his work well. A sort of appendix by Ælfric Bata, a pupil of Ælfric's and perhaps a Briton, gives the day of the oblate in the monastery. In 1005, Ælfric wrote a Life of Ethelwold, when he was abbot of Eynsham, which, like Winchester, had been converted by Ethelwold from a church of canons to one of monks. Until recently he was confused with another Ælfric, who died Archbishop of Canterbury in 1005. The date of our Ælfric's death is unknown.

A. F. L.

Reference: —

Dictionary of National Biography.

ÆLFRIC, ARCHBISHOP OF CANTERBURY. — This Ælfric (see *Dict. Nat. Biog.* on this point) was almost certainly the tenth abbot of St. Albans. He was later consecrated Bishop of Ramsbury, and died Archbishop of Canterbury in 1005. His importance in the history of education lies in the fact that he promulgated the canons (which have been variously dated, but almost certainly belong to the year 994–995) which laid the basis of the parochial system of education in England. The canons of King Edgar (960) (*q.v.*) had foreshadowed this system, but Ælfric adopted the parochial system which had been formulated (in imitation of the small elementary municipal schools that existed under the Empire from the first century, cf. Pliny the Younger's school at Comum) by Bishop Theodulf of Orleans at the end of the eighth century in pursuance of the ideas of Alcuin and Charles the Great, and given universal significance by Pope Eugenius II in 826. Canon 20 of the laws promulgated by Ælfric is a document of the first importance. It runs as follows: "Let Priests have schools in the townships (parishes) and small villages (*Presbyteri per villas et vicos scholas habeant*), and if any of the faithful wish to commend to them his little children for the learning of letters, let them not refuse to receive and teach them; but with the greatest love teach them remembering that which was written: those who shall be learned shall shine as the splendour of the heaven and those who shall teach many the right way shall shine as the stars for ever and ever (Dan. xii, 3). When therefore they teach them, let them demand nothing from them in the way of reward for this nor accept anything from them except what parents freely give to them out of a charitable desire." This provision brings education into touch on the one hand with local government, since the priest was the "mass-thane" and with four villagers represented the township, and on the other with the Bishop, who about this date created the official known as the *Magister Scholarum* (*q.v.*) and so controlled the parochial schools.

J. E. G. de M.

See Canon Law in Education.

Reference: —

Dictionary of National Biography.

ÆNEAS SYLVIUS BARTOLOMEUS PICCOLOMINI. — (Pope Pius II.) A typical humanist of the Renaissance period, born at Corsignano in 1405. Beginning as a student of law at Siena, he gave up this study for literary pursuits and studied for a time under Filelfo (*q.v.*) at Florence. Throughout a very versatile life, directed by an overpowering and selfish ambition, his interests were mainly literary. His early days were spent in the company of humanists, and he was not exempt from the sensualities of the time. But it is characteristic of him that he never apologized for his life at this time, and as pope republished some of his more questionable writings. His life career as a diplomatist was begun at the Council of Basle, where he became a secretary of the antipope, Felix V. Sent on an embassy to the imperial court, he accepted an offer to enter the imperial service, where, however, he remained in obscurity for some time. Gradually he won the favor of the Imperial Chancellor, and was advanced to important positions. At this time he found it convenient to change his views, and decided that the best way to further advancement would be to enter the Church. He now supported Pope Eugenius IV, and in return for his services in restoring the allegiance of Germany to the Papacy he was made Bishop of Trieste. He continued for several more years in the Emperor's service, and devoted himself to an agitation against the Turks. In 1456 he became cardinal, and returned to a life of intrigue at Rome, which resulted in his elevation to the Papacy in 1458, when he took the title of Pius II. He died in 1464, engaged to the end in political activity.

Æneas Sylvius was a product of the time in which he lived. Deeply imbued with an intense love for literary pursuits, he gave a literary turn to everything which he undertook. His works, which were not, however, complete, were published in 1571, and filled eleven folio volumes. They include a few poems, a large number of letters, writings on theology, philosophy, and history. He found time in the midst of his activities and intrigues to write *On the Nature of the Horse*, and a *Treatise on the Geography of Asia.* For the history of education the interest in Æneas Sylvius centers in a treatise on *A Liberal Education* (*De Liberorum Educatione*) written to Ladislas, King of Bohemia and Hungary, with whom he came into contact at the imperial court. This treatise represents the educational ideals of the Renaissance, which may be summed up in "the cultured gentleman." "Nature, training, and practice are the three factors of education." Importance must be attached to the choice of a teacher and companions. "In the right training of the boy lies the secret of the integrity of the man." He lays emphasis on the importance of physical training, the early guidance of a mother, and training in philosophy and letters. The curriculum is that which is typical of the Renaissance, and centers round grammar. Although a strong advocate of the cultivation of good style and expression, Æneas Sylvius' writings cannot be compared for Latinity and polish with those of many of his contemporaries. As he himself wrote, "My style of writing is bold and unpolished, but it is frank and without trappings."

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ÆPINUS (HOCK) JOHANNES. — (1499–1553.) A German schoolmaster, born in Ziesar (Brandenburg), rector of the school in Stralsund (1524–1528), from where he was called to Hamburg to carry out Bugenhagen's School Regulations (*q.v.*). He drew up church regulations for Stralsund, Hamburg, and other north German cities.

ÆSOP. — The reputed author of a collection of fables, which was certainly popular in Athens in and before the time of Pericles, is said to have been born at Samos (though other cities claimed his origin), and to have been brought to Athens while young as a slave. The date of his birth may have been the latter part of the seventh century B.C. Plutarch, Herodotus, and Phædrus describe Æsop as being enfranchised, visiting Crœsus, rebuking Solon, visiting Athens, where he is said to have composed the fable of Jupiter and the frogs during the tyranny of Pisistratus, and being finally cast from a precipice by the Delphians while on an embassy to them from Crœsus. The fables originated by Æsop may not have been at first put into writing, but had a great vogue among the ancients as oral tales. Socrates as a prisoner turned some of them into elegiac verse, and Demetrius Phalereus and Phædrus followed his example. The modern fables known as Æsop's are spurious, and apparently of oriental origin.

P. R. C.

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ÆSTHESIOMETER. — An apparatus for measuring the distance between two points on the skin which can be just recognized as separate from each other. A pair of ordinary drawing compasses may be used for this purpose, or a horizontal bar with adjustable points. The ends should be made of hard rubber or bone so as to avoid excessive stimulation of the temperature spots. E. H. Weber, who was the first to use such an apparatus, found that the distances which could be just recognized vary from one millimeter or less on the end of the finger, to six centimeters in the middle of the back. The apparatus is recommended by Griesbach as a means of measuring fatigue. German and others have rejected this recommendation on the basis of elaborate series of tests.

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ÆSTHETICS. — The philosophy of the beautiful in nature or art. — Æsthetics began in the earliest speculations of the Greeks concerning the nature of beauty and of art. Socrates raised the question of the relation between use and beauty, and tended to identify the two. In his discussions of the various arts he assumes that art is imitation, and that the artist can imitate even qualities of character. A successful imitation somehow gives pleasure. In discussing the art of the sculptor he tells us that the artist selects the best features from the various objects he has seen and combines them in a work which he is making.

Plato followed Socrates in the belief that art is essentially imitative. This fact alone was sufficient to condemn it in Plato's mind, for he held that the object which the artist imitates is itself merely a copy of the true ideal object. The work of art is, therefore, thrice removed from the truth. Plato also condemns art on ethical grounds. Homer and the other poets misrepresent the gods, and their influence is almost entirely bad. The imitation of bad models and the exercise of most of the emotions to which art appeals are injurious to strength of character and good citizenship. Plato is, however, a worshiper of beauty, and he places it upon an equality with truth and goodness. Beauty in the physical realm is akin to the useful or the purposeful, but it has also harmony and measure as essential qualities. It possesses, in addition, unity, purity, completeness, and perfection. Pure beauty is to be found in straight lines and curves, in simple and perfectly regular figures, in smooth and clear sounds, in pure colors. Spiritual beauty is identical with the virtues. Absolute beauty belongs to the world of ideas. The pleasure which beauty gives is pure and unmixed with pain.

Aristotle, like his predecessors, adheres to the imitative theory of art, but he broadens the application of the term "imitation." Art imitates nature, but nature is not made up simply of objects; it has also inner principles, and the artist imitates these as well as objects and activities. Music is, for Aristotle, the most imitative of the arts. Aristotle differs widely from Plato in his estimate of the ethical bearings of art. He regards art as a valuable source of relaxation, and an important means to education. The exercise of the emotions of pity and fear occasioned by tragedy effects a purgation of these emotions. Plato held that the exercise of such feelings tended merely to strengthen them. The impulse to the production of art is to be found in the instinct of imitation. The pleasure occasioned by the perception of a successful imitation is the pleasure of recognition. Aristotle did not discuss at length the nature of beauty, but he did assert that a beautiful object must have, in addition to an orderly arrangement of parts, a magnitude which shall be neither too small nor too great for easy comprehension in a single glance.

There is no conception among the Greek thinkers of a separate science or a separate field of study such as we think of under the name of æsthetics. With Socrates and Plato the discussion of the problems of æsthetics is usually incidental. Aristotle devoted a work to poetry, but apparently even he had no conception of æsthetics as a subject distinct from other subjects. It is true, however, that the Greeks did discuss most of the important problems of æsthetics. They discussed the nature of beauty, its relation to utility, the reason why it gives pleasure. These problems have persisted through the whole history of æsthetics. They discussed the nature of art, the impulses which give rise to art, the ethical significance of art. These, too, have been constantly in the foreground up to the present time. Plato raises the question as to the kind of pleasure which beauty gives, and this again is a question which is still awaiting a final answer. Plato attempts also to state the characteristics possessed by those lines and simple geometrical figures which are regarded as beautiful. This we are usually inclined to think of as a modern problem, and indeed the attempt at a genuinely scientific solution of it began only after the beginning of experimental psychology in modern Germany.

The later Greek thinkers contributed little to the discussion of the problems of æsthetics. Plotinus, the Neo-Platonist, had much to say of beauty, and gave to it a mystical significance. He was the first important thinker to hold the view that art has as its purpose the representation of the beautiful. The contributions made by the Roman writers, by the Church Fathers, by medieval thinkers, were very small. The most important contribution between the time of Aristotle and modern times was made by Longinus in his book *On the Sublime.*

There was a revival of interest in beauty and art in the Renaissance, but this interest was not speculative and did not lead to any important contributions to æsthetic theory. Later on artists and critics began to be interested in æsthetic problems, and they, as well as the philosophers, began to discuss æsthetic theories. In England, Shaftesbury revived certain of the doctrines of Plato. Hutchinson, a professor in the University of Glasgow, brought forward a conception which has since been influential. This was the conception of a "sense of beauty." Beauty is perceived by an internal sense, as colors are perceived by the eye.

Edmund Burke, in his *Essay on the Origin of our Ideas of the Beautiful and the Sublime,* attempted to enumerate the qualities which characterize such objects as can be called either beautiful or sublime. His contribution on this head was not very valuable nor very original, but another feature of his work entitled him to credit as the forerunner of present-day physiological æsthetics. His physiology was crude and his conclusions of historical value only, but he did conceive the possibility of correlating æsthetic feelings with certain physiological activities. According to his notion the feelings aroused by beauty were dependent upon a general physiological relaxation, while the feelings aroused by the sublime resulted from strain and tension. Among the writers of this period Hogarth should be mentioned. He attempted to discover the qualities of beautiful objects, and described what he called the "line of beauty," and the "line of grace." He formulated these after much experimentation and the examination of a great many works of art, but his conclusions were not fruitful.

The early Greek doctrine that beauty is dependent upon utility was to some extent adopted and broadened by many of the British thinkers. They frequently distinguished between original or intrinsic beauty and derived beauty. Hume and other thinkers of his type formulated and developed the doctrine of the association of ideas. This doctrine, by showing how a given quality might give pleasure by being associated with utility, or indeed with any other pleasure-giving quality, was offered as a means for accounting for derived beauty. This was one of the most important contributions of the British school. Such characteristics as those of grandeur, of gracefulness, and the like began to receive attention, and Henry Home, Lord Kames, contributed much to the discussion of these problems and indirectly to the thought of many later writers.

But no one of the writers already mentioned, whether ancient or modern, had used the term "æsthetics" in its modern meaning. Its first use in this sense is to be found in the *Æsthetica* of Baumgarten, Professor in the University of Frankfort in the eighteenth century. Æsthetics is derived from the Greek αἴσθησις, a word meaning "sensation," and Baumgarten used it in this connection because he believed that in beauty perfection is revealed to the bodily senses. Baumgarten not only employed the term "æsthetics," he also marked off the theory of the beautiful as a separate and distinct subject of study.

Most of the great German philosophers, critics, and poets of the eighteenth and early nineteenth centuries contributed to a greater or less degree to æsthetic theory. In many respects the contribution made by Kant is the most important in the whole history of the subject. He gave to æsthetics a status like that occupied by ethics and logic. In the philosophy of Kant the æsthetic experience is that which unites the divergent elements of sense and reason. The æsthetic experience is, therefore, in a certain sense, the focus of his thought. Beauty he defined as that which is, first, the object of a disinterested satisfaction; our enjoyment of it is not dependent upon its relation to any private interest of our own, or indeed to anything else whatsoever. It is intrinsically pleasing. Second, the judgment that a given object is beautiful, is "subjectively universal"; we feel that all others should agree with us in this judgment, and this demand for agreement is not based upon any logical premises or concepts, but is based upon our own immediate disinterested enjoyment of the object. Third, we feel that the beautiful object has the "form of purposiveness" without any definite purpose; it is not based upon any definite suggestion of utility, but there is a general suggestion of adaptation to purpose. Kant gave to the sublime an importance equal to that of the beautiful. The sublime impresses us through boundlessness of extent, or of power. It is that which we feel to be great beyond all comparison. We feel respect for it. Kant also contributed to that department of æsthetics which deals with the nature of art; art was for him the production of beauty.

Schiller regarded himself as a disciple of Kant, and worked out some important doctrines on the basis of suggestions which he found in Kant's writings. One of the most important of these is the doctrine that the impulse to the production of art is, in its nature, akin to play. That is to say, it is free, spontaneous activity with no ulterior purpose. This doctrine was revived and made much of by the Spencerian school. Schiller made a very important contribution to the literature of æsthetics in his letters on *The Æsthetic Education of Man.* In these he brings forward æsthetic education as a most important factor in the progress of civilization.

Hegel made a complete system of æsthetics, the most complete that history has seen. In this system, art aims at the creation of the beautiful, and the beautiful is the concrete embodiment of the idea. The idea is the very essence of things, the ultimate reality. Contemporary and later thinkers added their quota to the development of the subject. Schopenhauer, in direct opposition to the intellectualism of Hegel, made art the embodiment of the will.

A distinctly new line of development was set under way by Fechner, who applied to the study of æsthetic objects the experimental method. The speculations of Plato regarding the qualities of those geometrical figures which are beautiful, the conclusions of Hogarth regarding the " line of beauty," and the speculations of Zeising, a predecessor of Fechner, on the subject of æsthetic proportions in simple geometrical figures had not led to investigations which could be described as strictly scientific. Fechner's method was scientific, and it is interesting to note that his conclusion in one respect coincided with that of Zeising. Zeising had described the " golden section." This was a method of dividing a line in such a way as to make its division most pleasing æsthetically. The proportions were such that the shorter segment of the line bore to the longer segment the same ratio as the longer segment to the line as a whole. The rectangle of most pleasing proportions was one constructed with these two segments as dimensions. Fechner's experiments seemed to establish this theory. Much time and labor have been devoted to experimental æsthetics, but this branch of the subject is still in its infancy.

Another department of the subject which has recently become fruitful is that which is based upon the study of the art of primitive peoples. Studies in this field have tended to broaden theories of art beyond the conceptions arrived at by a study of European art alone. Many recent writers have added to the literature of the subject in their various fields. Psychology, general, experimental, and physiological, sociology, and anthropology have been the fields in which most recent writers have worked.

The problems of æsthetics may be grouped as follows: first, those that have to do with art, its nature, origin, and relations to other products of human activity; second, those which have to do with the beautiful, the sublime, the ludicrous, the picturesque, and related qualities. The theories of the nature of art are many. They include the ancient theory that art is imitation, the theory that art is the production of the beautiful, various intellectualistic theories of art, and the theory that art is emotional expression. Hegel's doctrine that art, in creating the beautiful, embodies the idea, which is the essence of things, the theory that art presents that which is significant in an object, or that which is characteristic either of the individual or of the type, or that which is the dominant feature, or that which is essential or universal to the exclusion of that which is unessential or accidental, are all intellectualistic theories. The theory that art is emotional expression holds that beauty, imitation, and the presentation of ideas of whatever sort, are simply means toward the expression of feeling. Theories of the impulse to the production of art are numerous, including the theory that the art impulse is to be found in the imitative instinct, or in the play instinct, or in the desire to attract by pleasing, or in the desire to give concrete embodiment to ideas, or to feelings.

Material for the study of these problems is found in the history of art and of artists, in criticism, in the psychology of art appreciation, in the study of the arts of primitive peoples. The problems which relate to the beautiful, sublime, etc., fall into two groups — those which are concerned with the characteristics of the beautiful objects, and those which are concerned with the qualities of feelings aroused by such objects. The answer to the first question is sometimes stated in metaphysical terms, sometimes in terms which are not metaphysical. The theory that the beautiful is the concrete embodiment of the True, the Good, the Divine, the Idea, or the Universal, are metaphysical in character.

The so-called " exact æsthetics " has attempted to discover by experimental methods the qualities or proportions of objects which are found to be æsthetically pleasing. This mode of approaching the subject has not yet given rise to any important independent generalizations. Usually the reaction against the metaphysical solution of these problems leads to one which is stated in psychological terms and in terms of the æsthetic experience. The question as to what a beautiful object is is answered by saying that it is the kind of object which occasions a given kind of experience. There is no universal agreement as to the terms in which this experience shall be described. Kant's description has already been mentioned. The Spencerian school holds that an æsthetic pleasure is a pleasure which is free from all suggestion of life-serving functions. Æsthetic feeling has been defined as pleasure which is objectified or thought of as a quality of the object (Brown and Santayana), as pleasure which is relatively permanent in revival (Marshall), etc. Physiological æsthetics attempts to state the differentia of æsthetic enjoyment in terms of bodily activity or bodily states.

Since the time of Kant æsthetics has occupied a prominent place in the curricula of German universities. Within ten years most of the more important of the older American universities have established courses in this subject, but in only a very few did æsthetics have explicit recognition a decade ago. Courses in literary criticism have frequently introduced a few of the problems of æsthetics: courses in metaphysics have occasionally contained some reference to the beautiful, and courses in psychology have sometimes called attention to the æsthetic experience, but outside of Germany the study of æsthetic theory has only recently become the object of wide interest.

The question of æsthetic education is a matter which has received comparatively little attention from those who have contributed to the advance of æsthetic theory. Schiller's interest in the subject of æsthetic education has already been noted, but he was an exception. The importance of æsthetic education has not yet received the attention it deserves, nor have the means for its attainment been supplied. Public art galleries, free concerts, and training in drawing have furnished some basis for such culture, but until the proper use of such means has been more completely worked out, and until the æsthetic elements provided by many of the present subjects of study in the ordinary school curriculum have been utilized, æsthetic education must proceed very slowly. The significance of such education from the standpoint of ethics, and from the standpoint of the most complete development of the individual, has frequently been mentioned, but there is no general movement toward an adequate provision for it. A serious difficulty is to be found in the fact that such education cannot be conveyed by precept, and an infectious example is not always to be found. A. L. J.

See Arts in Education; Art in the School; Art, Methods of Teaching; Museums, Music in the School, etc.

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ÆSTHETIC ELEMENT IN EDUCATION. — See Arts in Education.

AFFECT. — This term is sometimes used as a synonym for emotion. The German term *Affekt* is the exact equivalent of the English term "emotion."

See Emotion.

AFFECTION. — In common parlance this word is used to designate a strong personal attachment or love for another. In technical writing it is used to designate the process referred to by the term "affect" (*q.v.*), or the term "emotion" (*q.v.*), and sometimes the term "feeling."

AFFECTIVE. — There is no adjectival form of the word "feeling." The lack of such a form has led to the adoption in technical writing of the term "affective" to express that characteristic of consciousness which belongs to a state of feeling. Thus pleasure is described as an agreeable affective experience.

See Feeling; Emotion.

AFTER-IMAGE. — When an organ of sense, especially the retina, has been stimulated, the organic processes set up by the action of the external energy continue after the cessation of the stimulus. In some cases the process in the organ of sense will be reversed so as to restore the organ to a normal condition. Thus if one fixates for a period of, say, 30 or 40 seconds any bright light and then closes the eyes, or looks upon a medium gray or dark surface, without moving the eyes, a so-called after-image is observed. This image has the shape of the light looked at, and may be, especially if the light be bright, for an instant of the same general color and intensity. The color, however, soon changes. If the light fixated be ordinary white light, such as a white surface reflecting the rays of the sun, or an incandescent lamp, the second type of the after-image will be dark, although retaining the general shape of the source of light. If the object fixated be colored, the second form of the after-image will be the complementary color to that of the source of light. A red object will, for instance, become bluish green in the after-image; a yellow object, blue; a green object, purple, etc. The first type of the after-image is called positive; the second, negative. Positive after-images are undoubtedly due to the fact that the nervous apparatus concerned in vision retains for a while, even after the stimulus of light has been removed, the physiological effects of such stimulus. The negative after-image is probably due to some sort of reversal of this physiological process in the eye. R. P. A.

After-images of hearing do not appear; there are after-images in all other spheres of sensation.

See also Adaptation, Sensory.

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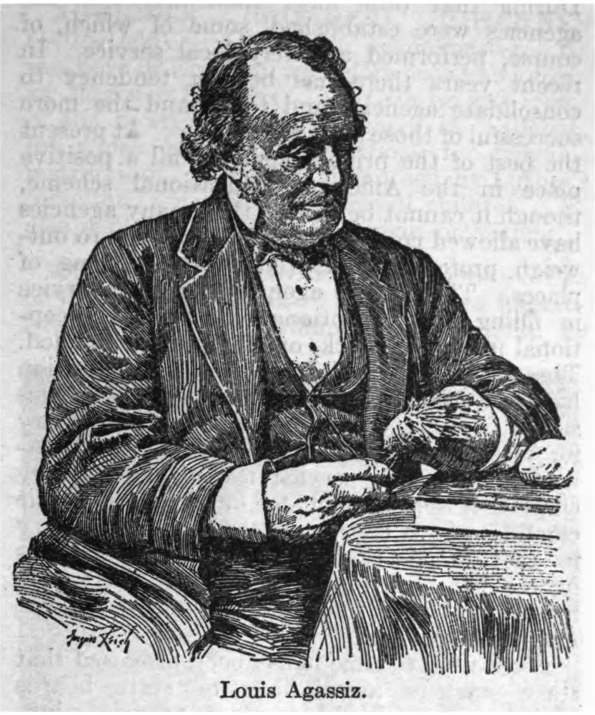
AGASSIZ, LOUIS (JOHN RUDOLPH) (1807–1873). — The distinguished naturalist and science teacher was born at Motier, in the canton of Fribourg, Switzerland, May 28, 1807, and received his elementary and secondary education in the gymnasium at Bienne and the college at Neuchâtel. It was the purpose of his parents that he should follow commercial pursuits, but his keen interest in scientific studies led them to allow him to take up the study of medicine — first at the University of Zürich, and later at Munich and Heidelberg. He was first professor of natural history in the college at Neuchâtel and director of a scientific observatory in the Alps. He visited France and England to acquaint himself with scientific men and movements, and in 1846 he accepted an invitation to give a course of lectures before the Lowell Institute in Boston. The year following he accepted the professorship of zoölogy and geology in the Lawrence Scientific School which Harvard University had just organized. In 1873 he organized on the island of Penikese a summer school of marine zoölogy for teachers, which brought most of the foremost instructors of science under his instruction. He was a natural teacher, says one of his students, fond of giving instruction, patient and sympathetic, overflowing with an earnest love of his subject, and having a mind replete with stores of information. The title of which he was proudest was that of the instructor rather than the investigator, and he took real pleasure in inscribing himself as "Louis Agassiz, teacher." He gave great impetus to the teaching of science in secondary schools, and, besides his textbooks on physiology and natural history, he published a work on methods of teaching natural history, and made notable contributions to the literature of ichthyology. He died at Cambridge, Mass., Dec. 14, 1873.

W. S. M.



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AGE, SCHOOL. — See Attendance, Compulsory.

AGE OF COLLEGE AND HIGH SCHOOL STUDENTS. — See Students, Age of.

AGENCIES, TEACHERS' EMPLOYMENT. — In an informal manner, academies, colleges, and normal schools in their early history in America acted as employment agencies, to the extent of receiving applications for teachers and making recommendations for vacancies. Toward the close of the nineteenth century, this work within educational institutions was much systematized, and now it is usually directed by a special secretary or agent, who systematically compiles estimates of candidates, obtains information regarding possible sources of employment, and directs eligible teachers to the right positions. As a rule, this service in institutions is gratuitous to teacher and employing body.

Private agencies on a commercial basis have existed since 1855, but the period of their extensive development was from 1870 to 1890. During that time more than fifty different agencies were established, some of which, of course, performed a purely local service. In recent years there has been a tendency to consolidate agencies and to expand the more successful of those already existing. At present the best of the private agencies fill a positive place in the American educational scheme, though it cannot be denied that many agencies have allowed commercial considerations to outweigh professional standards in the filling of places. The private agency is of most service in filling the exceptional positions — exceptional in type of work, or efficiency demanded. The unassisted teacher of special preparation has few opportunities of finding vacancies suited to him; the agency with its machinery for locating places can make valuable adjustments. For this service the agency usually charges a registration fee, and assesses the candidate for a certain percentage of his salary in case of election. The assessment varies from 5 per cent to 10 per cent of the salary for the first year, or it may be half of the first month's salary.

From time to time it has been proposed that state teachers' associations or state boards of education should conduct agencies, but, so far as known, the only move in this direction has been the law passed by Massachusetts: —

"Any person desiring to teach in the public schools of this commonwealth may file with the state board of education an application in writing stating the kind and grade of school desired and the experience and training of the applicant, and may file with such application any evidence of the applicant's character and qualifications.

"It shall be the duty of the board to receive such applications, to make lists of the same arranged for convenient reference, and on request of the superintendents of schools and school committees of cities and towns to furnish all reasonable information about such applicants. The board may make reasonable rules and regulations relating to the filing of applications and the giving of information as above provided." (Chap. 399, Acts of 1906, as amended, Chap. 213, Acts of 1907.)

The private agency in England exists to a far greater extent than in this country, since the great majority of educational positions are filled by selection from a number of applications rather than by direct recommendation from a college or other institution. The universities have recently instituted appointment boards under the charge of a secretary, but it is too early to make any statement as to their success. Teachers' associations have also within very recent times established agencies with special terms to members. The percentage usually charged varies from 2½ to 5 per cent of the first year's salary. The university agencies make no charge at all, as a rule.

See University Appointments Boards and Secretaries.

References: —

Nothing exists in the way of general references. Private agencies have issued various papers which serve to indicate the historical backgrounds.

AGENTS. — See Supervisors.

AGGREGATE IDEA. — This term is employed by Wundt (*Outlines of Psychology*) and other writers to refer to the first stage of experience in which an individual looking at a complex situation gets a complex experience which is not analyzed into its elements. Later development in the presence of such an experience will consist in breaking up of this idea into clearly defined parts which in turn will be combined into more definitely organized experiences. "Aggregate" in this case indicates that the first stage of the complex experience is dependent upon chance complexity rather than upon definite order of the arrangement. Thus the child's first view of a picture is a complex or aggregate idea. His later experiences with the same picture differ from this original experience in clearness and organization.

AGNES SCOTT COLLEGE, DECATUR, GA. — A female college, founded by Presbyterians, in 1889, as a grammar school. Fourteen units are now required for admission. Courses are offered up to the B.A. degree after four years' study. There are in the college 12 professors, 1 associate professor, and 4 instructors and assistants. In connection with the institution are a School of Music, Art, and Expression and an Academy, each with its own faculty. There were, in 1909, 146 students in the college. F. H. Gaines, D.D., is the president.

AGNOSIA. — The inability to understand speech. See Aphasia.

AGRAM, THE ROYAL FRANCIS JOSEPH UNIVERSITY OF. — This institution in the province of Croatia, Hungary, was not established until 1874, although as early as 1776 the old Jesuit school in Agram had been transformed by the Empress Maria Theresa into a *regia scientiarum academia*, comprising faculties of philosophy and law. The faculty of theology was organized in 1874, and in the following year a division of mathematics and natural sciences was added to the faculty of philosophy. A school of forestry is affiliated with the latter faculty, and a school of pharmacy has also been established recently. The language of instruction is Croatian. The annual expenditures amount to about $100,000; the library contains about 125,000 volumes and almost 800 manuscripts. 1059 students were in attendance during the winter semester of 1909–10, of whom more than half were enrolled in the faculty of law, the institution not supporting a medical faculty. All of the departments of the Croatian National Museum, founded in 1846, are closely affiliated with the university, as is the South Slavic Academy of the Sciences and Arts, organized in 1866, which has a collection of about 400 paintings, 2650 manuscripts, 30,000 documents, and 40,000 books. The university also stands in close relationship to the Royal Meteorological Observatory, established in 1861, which is the central station for Croatia and Slavonia; a seismological station is connected with the observatory.

AGRAPHIA. — A disorder of the associations of speech, in which there is a partial or complete inability to express ideas by means of written symbols, in an individual who had previously acquired this mode of speech expression. Often associated with apraxia (*q.v.*), and with the so-called motor aphasia.

See Aphasia. S. I. F.

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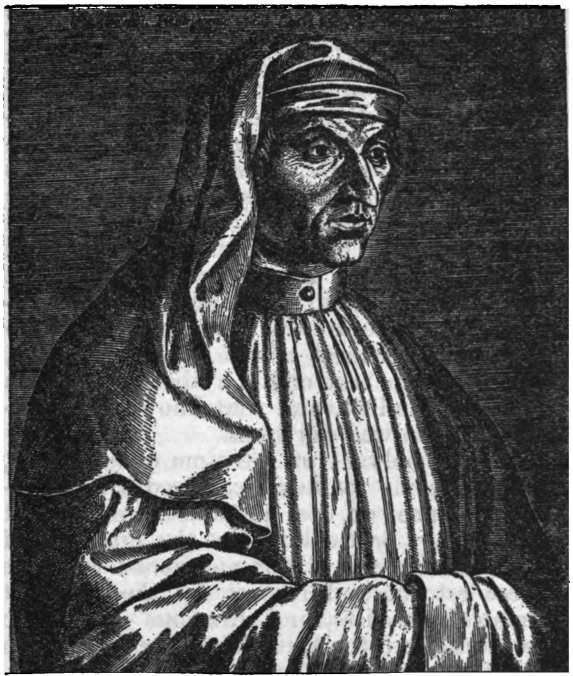
AGRÉGATION. — The highest teacher's diploma of the French secondary schools, required of all full professors in the lycées (*q.v.*). In the boys' schools there are eight orders of agrégés, viz. philosophy, letters, grammar, history and geography, mathematics, physical sciences, natural sciences, and modern languages (English, German, Italian, Spanish). The candidates for the agrégation, the examination for which comes generally at the completion of the course in the higher normal school, although it is not restricted to students of that institution, must already hold the bachelor's and the master's degree and the diploma of higher studies. The difficulty of this examination is still further increased by the fact that it does not depend upon attaining a certain standard of intellectual power, but is a competitive examination, the number of appointments to be made in each group being determined by the Minister one year in advance in accordance with the probable needs of the service. The possession of the agrégation carries with it five hundred francs per year over and above the regular salary attached to the position. There are five agrégations for women, viz.: letters, history, mathematics, physical and natural science, and modern languages. There are likewise agrégations in the various fields of professional education: law, medicine, and pharmacy.

See France, Education in.

AGRICOLA (SNEIDER) JOHANNES (1492–1566). — A German schoolmaster. He was born in Eisleben, wherefore he is also known as Magister Eisleben. In 1525 he was rector of the newly established school in Eisleben, for which he wrote a textbook for religious instruction. In 1527 he composed, by Luther's direction, a catechism for small children. He also made a collection of German proverbs.

AGRICOLA, RUDOLPH (1444–1485).— One of the most influential of the northern humanists. Born near Groningen in Holland, he attended the school in that town. It is impossible to verify the tradition, which is of late origin, that he attended the schools of the Brethren of the Common Life (*q.v.*). At the age of 14 he obtained his bachelor's degree at Erfurt, and at 17 his master's at Louvain. His main interests at that time were in mathematics and philosophy. In 1468 he went to Italy and began a study of law at Pavia, which he soon abandoned to study Greek under Battista Guarino (*q.v.*) and Theodore



RODOLPHVS AGRICOLA GROENINGVS.
Si tibi maturis tautum licuiſſet ab annis,
Quod medium ſtatuis perficere Agricola;
Auctores alij poterant tacuiſſe diſerti:
Quidquid enim ratio poſtulat. ipſe dabas.

Rudolph Agricola.

Gaza (*q.v.*), who interested him strongly in Aristotle. Unlike the majority of his contemporaries, Agricola paid considerable attention to the vernacular language. He had already a knowledge of French and German, and he now took up Italian in order to enter into the spirit of the movement which he saw going on around him. He was one of the most accomplished of the northern humanists, and is reputed to have been a great musician and an ardent lover of the fine arts. In 1479, he returned to Holland, and although he had several offers, he refused to accept any appointment which would fetter him too much and interfere with his studies. In 1484, he accepted an invitation from a former pupil of his, von Dalberg, then Bishop of Worms, to move to Heidelberg. Although he delivered some lectures at the university, it is probable that he did not hold a chair there. At this time his inclinations turned to theology, and he took up the study of Hebrew. His career was, however, cut short by his early death. Of his writings the most important are the *De Inventione Dialectica,* a treatise on the importance of logic as a factor in good style. His educational treatise, *De Formando Studio,* shows Agricola to belong to the school of humanistic realists. Nothing was to be taught which had not the sanction of the ancient writers. All wisdom, all phases of experience for present guidance, are found in the classics. Theophrastus and Aristotle are the best exponents of geography and natural science. Like Erasmus, he held that the true end of a liberal education was moral conduct, and that knowledge without expression was worthless.

Although only 41 at the time of his death, Agricola seems to have exercised a remarkable influence on the humanistic movement in Germany, particularly in the direction of a study of Greek. He is mentioned with the highest esteem and respect by the foremost German humanists, and Erasmus is said to have confessed to Agricola's superiority. In view of the fact that Agricola wrote but little, his position must have been due to a remarkably strong personality.

I. L. K.

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AGRICULTURAL EDUCATION. — Late in the eighteenth century and immediately following the American Revolution, great popular interest in agriculture arose. Essays and books began to appear, agricultural papers sprang into existence, and the profession of farming commenced to have a literature. The immediate result of this awakened interest was the formation of agricultural societies in many sections of the eastern United States. These organizations at once became centers of agitation for agricultural schools, and a goodly number of such schools of different grades were actually opened; notably one established in Maine, 1821, and one in Connecticut, 1824, which latter flourished for a number of years and was obliged to increase its capacity for students. The natural conditions, however, seemed to be against fruitage of this early movement in the East. With the development of the great West, and with the enormously profitable slave labor of the South, interest in agriculture was transferred to the newer sections of the country. In the Northern states, particularly, history repeated itself. With their development came again agricultural societies and the agitation for agricultural schools; but this was a generation afterward, characterizing the late forties and fifties. Here, again, agitation developed at different points, namely, New York, Pennsylvania, Maryland, and Michigan.

Publicly Endowed Education. — At this time college education was primarily the business of the Church, and colleges subsisted upon private subscription. Accordingly the early efforts toward financing colleges of agriculture assumed their support by private endowment, and only later did it occur to farseeing men that this new and expensive form of education would need to be supported by public endowment if it were to succeed. Much difficulty was encountered in turning over to the public what had been started as private enterprises.

Pennsylvania Agricultural College underwent a long and pathetic struggle with poverty, and it was more than a generation before the state fully equipped it to do the work for which it was founded. The movement in New York and elsewhere came to an abrupt end with the oncoming of the Civil War. Michigan was more fortunate. A constitutional convention was in session in the early days of agitation, and some farsighted member succeeded in introducing into the new constitution, adopted in 1850, a clause making it obligatory upon the state at an early date to establish and maintain a college or school of agriculture either in connection with the state university or separated from it. Under this provision the Michigan Agricultural College was opened for students, in 1857, or five years before the Morrill Land Grant Act of 1862. In this state, therefore, the agricultural college was from the outset a state institution, and was accordingly freed from the long starvation period suffered by others during their transformation away from the plan of the private endowment.

The Land Grant Act. — Not only the earlier movements in Maine and Connecticut, but the later in Pennsylvania, Maryland, and Michigan, were distinctively for agricultural education, with no reference whatever to other industries. In New York the movement for agricultural education began early, and by the middle of last century became associated with a movement for education in mechanic arts.

About this time, however, another movement arose. It developed in Illinois, and was headed by Professor Jonathan B. Turner of Illinois College. Its immediate purpose was to secure the funds arising from the old territorial land grant (Northwest Territory) for the establishment of an "Industrial University." [1] The teachers of the state desired these funds for a normal school. The teachers won and Turner lost, whereupon he advocated a national policy of a grant of land to each state for the establishment of at least one college which should be conducted in the interests not only of agriculture, but of the mechanical arts as well. This plan of Turner's was adopted by the General Assembly of Illinois as a joint resolution, and in this form transmitted to Congress in 1853.

Nothing seems to have come of this memorial to Congress at this time, but four years later (1857) Justin P. Morrill, then a member for Vermont serving his first term in the Lower house, introduced a bill providing a grant of land to each state for the identical purpose advocated by Professor Turner. The exact relations between Professor Turner and Congressman, afterward Senator, Morrill have never been definitely established, because much correspondence was burned during the Civil War, but it is known that they conferred.

The bill had the usual experience of new projects, complicated by the feeling that too free use was being made of the public lands in too many grants, both public and private. Once the bill passed both houses, but it was promptly vetoed by President Buchanan. It passed again, however, and was approved by President Lincoln, July 22, 1862. Thus did the United States in the early days of the greatest civil war of history lay the foundation for a national system of industrial education with but one alteration in the original scheme, namely, a provision that military instruction should be given in all the colleges to be established under the new grant.

The Land Grant Colleges. — The provisions of the land grant, or, as it is commonly called, the First Morrill Act, donated to each state in the Union public land scrip to the amount of 30,000 acres for each senator and representative then in Congress, the income from the sale of which should be "for the endowment, support, and maintenance of at least one college, whose leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." It was clearly the purpose of the Morrill Act to establish a new type of college, and one that should be distinctly industrial. The objects in view were unique in another particular, namely, they aimed primarily at community development rather than the benefit of the individual student.

Children from industrial families had been freely admitted to college, but only to be drawn from the industries into the learned professions, which were the only activities recognized by the then existing colleges. While this answered well enough the purposes of individuals, it was held by the promoters of the land grant act to be against the general welfare that a great system of public education should always draw from the industries, and particularly from the farm, without restoring an equivalent, either in men or in educational advantage. They held that this was universal education only in a personal sense, and that what was then needed was a new kind of college that should educate all who were so inclined as directly for industrial pursuits as the old-time colleges had educated for the learned professions. The primary purpose was clearly the development of the industries through the applications of science and the activities of educated men, all of which was held to be the more important as the industries were at the basis of all civilization and would always engage the lives and activities of some 90 or 95 per cent of the people.

Each state accepted the lands and proceeded to establish its new college according to its local conditions and its peculiar interpretation of the Morrill Act. From the fact that the new states were not yet well organized, and that in the old states many privately endowed institutions were languishing for lack of funds, it is hardly strange that they agreed in but one respect, and that was to accept the grant, often without much regard to the peculiar injunctions of the bill. Accordingly, in the East, speaking broadly and wherever there were struggling colleges, the land grant was turned over to existing institutions, whose faculties knew little and apparently cared less about what the law intended to accomplish. They had troubles of their own, and, without really getting into the situation, they too frequently met the conditions of the act in a perfunctory way by offering an agricultural and a mechanical course very largely made up of existing offerings. In the West the funds were quite generally used to start state universities that too often operated in the interest of general education, without devoting much energy to the propagation of the peculiar educational ideals which the Morrill Act was supposed to establish.

In the Middle West an intermediate course was pursued. Michigan and Pennsylvania already possessed each an agricultural college. In both cases the proceeds of the land grant were at once turned over to these institutions, and all energies were devoted to agriculture, ignoring for many years the mechanical interests provided for in the act. In still other cases in the Middle West and in the Southern states, no college like those of Michigan and Pennsylvania being in existence, it was quite general to recognize the mechanical clause and put in both agricultural and mechanical courses, sometimes frankly calling them agricultural and mechanical colleges, but often ignoring entirely in the name all reference to mechanics and calling the institution simply an agricultural college, a name that some still retain, though offering both courses.

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[1] See "A Plan for an Industrial University," United States Patent Office *Report*, 1852.

Of all the separate agricultural colleges so named, that of Massachusetts alone is strictly agricultural. In some cases the new name, "State College," has been chosen by these institutions so inappropriately named at the outset. In still other cases the state from the first supplemented the land grant funds and broadened the educational purpose under the term, "State University," a class of institution which in these latter days is not only satisfying the provisions of the Morrill Act, but is ministering to the education and the development of the state in all its important activities.

In this heterogeneous way did the country begin to execute its mixed and uncertain policy of industrial education of college grade. Very little serious study was given to the new and far-reaching policies introduced thus suddenly into the educational arena, and it may be said to the credit of some educators and to the discredit of others that few of them indeed realized that anything new had really happened beyond an attempted union of impossible things, and some even fancied they were rendering a real service in helping to remove this educational anomaly, whose powers for evil seemed gigantic and whose powers for advance were not understood.

Neither agriculture nor mechanics was at first prepared to prosper, educationally. Neither had approved courses of study, neither had a literature, neither had skilled teachers, and both were destitute of the matter and the methods of instruction. Added to this, there was no definite call for instruction in the industries. Many people from the industrial masses desired education, it is true, but not to increase their industrial efficiency. It was rather to escape from the industries into what they regarded as a life of ease in the professions.

Without teachers, without matter, methods, or ideals, and above all without an enthusiastic clientele, — for farmers generally scouted at "book farming," — it is not strange that the "new education" languished. Mechanics, or, as it later came to be called, engineering, fared better than agriculture. The basis of its subject matter is mathematics. Its material was thus from the start more exact than were the chemical and biological principles on which agricultural science was later to develop.

Added to this was the impetus given to invention and construction, especially of transportation facilities and manufacturing plants, by the conditions prevailing immediately upon the close of the Civil War. Moreover, the first results of engineering instruction were stimulating and unexpectedly successful, whereas the earlier efforts in agriculture were pitifully unsuccessful, because from the lack of scientific data they were mainly directed to the handicraft of the profession. By 1880 engineering courses were fairly established, fully twenty years ahead of courses equally successful in agriculture. The universities soon learned to tolerate engineering and a little later to respect it, but for forty years they had little but contempt for agriculture and agricultural courses.

It was during those dark days that the services of Michigan Agricultural College stand out clearly. It was the work of that pioneer institution, which graduated its second class in the year the Morrill Act was passed, that did more than all other influences combined to demonstrate that there really is such a thing as education for the affairs of country life, and it is not too much to say that through the sixties and seventies, or for more than twenty years, it was the only experiment of the new order worth mentioning. Following in its footsteps, Massachusetts came on, as did Kansas and Iowa, both to a large extent founded on the "Michigan idea," as it was called. Pennsylvania emerged from its financial embarrassment and joined the ranks, but Michigan and Massachusetts must be regarded as the two centers from which the later development in agricultural education chiefly emanated.

Influence of the Experiment Stations. — In 1887 Congress passed a bill providing that $15,000 in money be appropriated to each state for the organization and conduct of an experiment station in connection with its agricultural college. Two facts had become painfully apparent. One was that the lands of the original grant had been largely wasted, and the other that agriculture lacked a body of exact scientific data on which to establish courses of reliable instruction. Accordingly the Hatch Act appropriated money instead of lands, and made rigid provisions for its expenditure along strictly agricultural lines and for research only. In spite of the utmost precautions, some of these funds were absorbed in teaching by institutions still embarrassed for funds, and by men who scarcely knew the meaning of research, or, if they did, were ignorant of how to conduct it.

But in time, and even in a surprisingly short time, results began to appear. There were men who knew how to discover the laws on which plant and animal growth depend, and those on which the soil produces, and gradually the scientific principles underlying agricultural practice began to be established. Moreover, these principles worked when tested out in practice, and for the first time young men fresh from college, but in possession of these principles, succeeded better than had their fathers, though to the art and the manner born. That was what made agriculture respectable in the universities, and about 1905 this subject had gained a permanent standing in some of the best of the state institutions, which means that at last it was alongside other great fields of inquiry challenging the abilities of the best scholars of the times. Its further progress was greatly stimulated by the "Second Morrill Act" of 1890, which was a cash appropriation of $25,000 annually for teaching purposes; and this is now supplemented by the Nelson Amendment of 1907 for a similar amount.

Different Kinds of Agricultural Colleges. — Roughly speaking, and allowing overlapping more or less, there are nine kinds of agricultural colleges, as follows: (1) The agricultural college that offers agricultural courses only, of which Massachusetts is about the only example. (2) The college that offers courses in both agriculture and engineering, some being known as agricultural and mechanical colleges, as in Mississippi; some as state colleges, as in Iowa and Pennsylvania; and a few as agricultural colleges, though not confining themselves to agricultural courses, as in Michigan and Kansas. (3) The agricultural college that is connected with a state university and constitutes one of a half dozen or more separate colleges, of which engineering is a coördinate member, as in Wisconsin, Illinois, Missouri. (4) The agricultural college that has a similar connection with a university not a state institution, as in New York at Ithaca (Cornell). (5) The college that is organized in intimate relation with its experiment station, as in Wisconsin, Minnesota, Nebraska, Illinois, Missouri, Michigan, Kansas, etc. (6) The college that is separated from the experiment station, which exists as a separate organization in a distant part of the state, as in Ohio and Georgia, and to some extent in Connecticut and Louisiana. (7) The college that is distinct from the station, but which has its offices and laboratories upon the same campus, and perhaps within the same buildings, and therefore under the same board of management, as in Maine. (8) Colleges that conduct schools of agriculture of secondary grade in connection with the college organization, notably Minnesota and Nebraska. (9) Colleges that conduct "short courses" of ten to twelve weeks in the winter and for one or more years for students not able to take the regular academic work. Such courses are severely technical, and are to be distinguished from the so-called convention week or farmers' week observed in most of these colleges of all classes.

Courses of Instruction. — In general, the agricultural colleges undertake to teach not the art but the science of agriculture and the meaning of country life. To this end they generally insist that approximately one half the time be devoted to technical courses, and the other half to the humanities and to the sciences related to agriculture. In the colleges connected with universities the technical work only is given by the agricultural organization, the sciences and other nontechnical subjects being taken with other students in the general university departments. In the separate colleges, perforce, scientific and literary departments must be added. But few set courses are in use, but in general the technical instruction is divided into many units, leaving large liberty of election, with definite prerequisites for difficult courses and with certain specific requirements for graduation. Students graduate from the agricultural colleges with the degree of B.S., sometimes with B.S.A. Speaking generally, the colleges connected with universities maintain the same standards for graduation as do the other colleges of the institution, and are somewhat above those of the separated colleges. Matriculation is generally based upon 14 to 15 units of high school work, with a few exceptions, and with more or less liberal provisions as to special students temporarily admitted to classes pending the completion of their matriculation.

Origin of the Short Course. — The earlier attempts, especially of the universities, failed because they erred in assuming that technical instruction in agriculture should follow and not precede or accompany the work in related sciences. They erred also in forgetting that no traditions existed whereby young men expected to fit themselves for college instruction in agriculture. Accordingly, admission was mostly beyond the reach of even the few who ventured to enter the new courses, and for these technical instruction was so long deferred that interest waned and died out. For these and other reasons, the attendance everywhere was nominal, and the experiment was tried first in Wisconsin of opening classes in technical instruction for 10 to 12 weeks during the most favorable season, the winter, and admitting without condition and without credit. This is the short course. It drew large numbers, and has been conducted by most though not all the colleges connected with universities, and by many not so connected.

Attendance. — For years, as has been stated, the attendance of genuine agricultural students upon the strictly college course was exceedingly limited, but latterly, with the increased value of land and the new interest in agriculture, the number of students is rapidly increasing. The following list shows the increased attendance of one of the larger agricultural colleges, which is by no means exceptional, and at the time of writing for the first time one of the largest and best equipped agricultural colleges has been obliged to turn away students, even though five years ago it had but a normal registration: 1898–1899, 25; 1899–1900, 90; 1900–1901, 159; 1901–1902, 232; 1902–1903, 284; 1903–1904, 339; 1904–1905, 406; 1905–1906, 430; 1906–1907, 462; 1907–1908, 528; 1908–1909, 531; 1909–1910, 660.

Household Science in Agricultural Colleges. — Under the above term, or its equivalents, domestic science or home economics, the agricultural colleges in most of the states have done much to develop the study of household affairs upon a strictly scientific basis. For the most part the departments are succeeding from the standpoint both of college instruction and of public gatherings, such as farmers' institutes. Just why this subject should have become the special protégé of the agricultural colleges it is difficult to see, except as we discover that these colleges are peculiarly likely to function as public service institutions. (See HOUSEHOLD ECONOMICS.)

Extension Work. — Either under this head or that of institute work, or both, all of the land grant colleges of agriculture, whether connected with universities or distinct, are doing an immense and rapidly growing work. It is a distinct attempt to take the results of new discoveries and advanced practice direct to the people by avenues outside the classroom, a proceeding quite consistent with the theory that the state university and the state college exist primarily for the community benefit.

Results. — Does the instruction given in the agricultural colleges influence agriculture? and do the colleges educate toward or away from the farm? The answer is clear to both questions. Under the influence of the college, and its co-worker, the experiment station, a new agriculture is developing in this country in the hands of an educated and progressive people who will mostly live in the open country. The keynote of this new agriculture is business organization and a knowledge of the scientific principles underlying successful practice. Under new influences land is rapidly rising in price, and for the first time its fertility content is valued at its true significance and is being considered from its bearing on a permanent agriculture.

Statistics show that approximately 55 per cent of the graduates from the colleges connected with universities are actively engaged in farming, and that 95 per cent are in agriculture in some form. The 45 per cent in agricultural activities other than farming are accounted for by the large and growing call for teaching either in colleges or schools and for service in the experiment stations, — indeed, so popular is the new demand that professional teachers and students are now attracted to the field quite independent of the consideration of the practice of farming.

Of the still larger body who do not graduate, practically all are engaged in farming, and to the credit alike of the instruction, the subject, and the men, it may be said that the percentage of failures, whether of graduates or otherwise, is remarkably low. Education in and for agriculture seems to be remarkably successful, and with the improvements that are bound to come in the very near future, it will stand as one of the most efficient of all forms of education. E. D.

Agricultural Experiment Stations. — The first institution of the kind was established in his private capacity by Mr. John Bennett Lawes in 1843 at Rothamsted near London, England. In 1851 the first public station was organized at Möckern, Germany, with Dr. Emil Wolff as director. So efficient and useful has scientific research proved to be in promoting the art of agriculture that agricultural experiment stations, and agencies having a like function, have increased rapidly throughout the entire civilized world, the total number in existence at the present time probably exceeding 800. In 1904 the number was 798. In the United States such stations now number 61, of which every state and territory has one or more. The foundations of these institutions were really laid in the act of Congress approved July 2, 1862, known as the First Morrill Act, which donated public lands to the several states for the purpose of establishing colleges whose main purpose should be to teach such branches of learning as are related to agriculture and the mechanic arts. These colleges, nearly all of which began an active existence in the late sixties, through their influence on the public mind and their training of young men inclined to enter the field of agricultural science, prepared the way for the later organization of experiment stations. Indeed, many of the colleges themselves encouraged members of their faculties to enter upon the work of inquiry in the interests of agriculture, some institutions going so far as to more or less formally organize efforts for agricultural research.

The development of experiment stations in the United States, briefly expressed, has been as follows: There was first more or less agricultural inquiry carried on by the colleges established under the terms of the Morrill Act of 1862; these efforts undoubtedly led to the formal establishment of experiment stations by the states, the first of these being organized at Connecticut in 1875, the number rising to about 20 by 1887; the passage in 1887 of an act, approved March 2, of that year known as the Hatch Act, granting federal aid, $15,000 per annum, to each state and territory for the purpose of establishing an agricultural experiment station in order " to promote scientific investigation and experiment respecting the principles and applications of agricultural science "; further legislation, approved March 16, 1906, known as the Adams Act, appropriating additional money to each state, ultimately amounting to $15,000 per annum, for the more complete endowment and maintenance of agricultural experiment stations, this money "to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States." In this connection recognition should be given to the influence of a few men connected with the older colleges and universities, including Professors Brewer and Johnson of

Yale University, Professor Storer of Harvard University, Dr. Evan Pugh, President of the Pennsylvania State College, and Dr. W. O. Atwater of Wesleyan University, who were potent factors in promoting a study of science in its relations to agriculture.

Under the stimulus of the provisions of the Hatch Act the majority of the stations now existing were organized in 1887 and 1888, and with a few exceptions are established as departments of the colleges of agriculture and mechanic arts. The total income of the stations from all sources is now approximately three millions of dollars, more than one half of which is outside of federal aid, the direct appropriations by state governments amounting to nearly a million of dollars. Each station has an administrative officer known as the director, with whom is associated a staff of scientific experts and such clerical help as is necessary for administration purposes. In 1908 the stations employed 1143 persons in the work of administration and inquiry, more than one third of whom were also teaching members of the faculties of the colleges to which the stations are attached.

It is provided in both the Hatch and Adams acts that the national Department of Agriculture shall exercise an advisory, and within certain limits a supervisory, relation to the experiment stations established under the provisions of these acts. It is made the duty of the Secretary of Agriculture " in general, to furnish such advice and assistance as will best promote the purpose of this [Hatch] act." Beginning with the agricultural appropriation act of 1904, the Secretary of Agriculture is also directed to ascertain whether the appropriations to the stations are expended in accordance with the provisions of the federal law. The Adams Act contains a similar provision. In 1888 the Office of Experiment Stations was established in the Department of Agriculture as an agency through which to deal with the stations, and each year a representative of this office visits each station and inquires into its work. This in no way interferes with the autonomy of the states in organizing and directing the activities of the stations in conformity to the federal laws.

The subjects to which the stations are giving attention are numerous, but are chiefly included under the heads of agricultural engineering, agricultural technics, agronomy, animal husbandry including poultry, animal nutrition, animal pathology, agricultural and pathogenic bacteriology, economic entomology, forestry, horticulture, mycology, plant nutrition, and plant pathology. In the pursuance of their investigations the stations use both laboratory methods and observations in the realm of practice. For instance, the problem of the influence of particular fertilizers upon a given crop requires that the field experiments shall be supplemented by chemical determinations; a new insect pest can be most successfully attacked after its life history is known; the life processes of a pathogenic organism affecting either animals or plants must be known before intelligent preventive measures are possible; problems in the nutrition of animals require elaborate chemical study of metabolic processes, the technics of dairying are largely based on chemical and bacteriological research; and so on through the whole list of agricultural problems. This means that inquiries in the field of so-called pure science must be coördinated with a study of the utility to agriculture of the knowledge that is acquired.

The results which the stations reach are given to the public mostly in publications known as bulletins, which vary in type from those purely technical to those of a popular character. Some stations issue an annual report which contains a complete account of the work and operations for a year. Station investigators frequently publish articles in scientific journals. Circulars and press bulletins are also sent out. For 1904 the stations issued 499 annual reports, bulletins, and circulars, to 889,000 addresses on the regular mailing lists. Under the terms of the Hatch Act these various publications are distributed through the mail without the payment of postage. An extensive correspondence with farmers has grown up, amounting to thousands of letters annually from a single institution. Members of station staffs assist in maintaining farmers' institutes, which were attended in 1908 by nearly 2,500,000 persons.

The experiment stations should be regarded as agencies created to exercise a distinct function that is fundamental to the progress of agricultural science, viz. scientific research along lines related to agricultural practice. This function does not properly include academic or popular teaching or the administration of laws. But it can scarcely be said that so far any American experiment station has devoted its energies entirely to the work of inquiry, and some stations have not confined their efforts even chiefly to the field of real investigation. In several states the stations have not only been charged with the scientific service incidental to inspection laws, but also with the duty of initiating and maintaining prosecutions for the violation of the provisions of such laws. Other causes have operated to minimize the extent and efficiency of research efforts. First of all, not far from two fifths of the members of stations are also college teachers, an arrangement said to have the advantages of economy of effort and of associating research with teaching, but which under conditions that have existed has undoubtedly often reacted seriously upon the station activities. It cannot be said that in the matter of available time or in the range of subjects taught the teaching conditions in our American colleges are generally favorable to the spirit of inquiry. Again, demands of the agricultural public for the solution of problems and the means provided by national and state governments have been greatly in excess of the supply of men adequately trained for the expenditure of funds in capable investigation. More than this, members of station staffs have done a large amount of publicity work incident to the necessary legislative support and the cultivation of public understanding and good will. A most serious influence has been the practical coercion of station workers into superficial inquiry and immature conclusions in an attempt to promptly justify the expenditure of public funds for scientific aid to agriculture. This has been accompanied by such a diffusion of effort in a great variety of directions as to preclude the severe study of very many problems. But notwithstanding these untoward conditions, the experiment stations have worked out many results greatly valuable to both science and practice, and have exerted a marked and helpful influence in enlarging and modifying the subject matter of the classroom and in elevating the standards of farm management. As time goes on there will undoubtedly come about on the part of these institutions a closer adherence to their special functions which will undoubtedly make possible results of higher scientific and practical value. W. H. J.

Agricultural Instruction in the Lower Schools. — The agricultural colleges have done much, during the past forty years, to prepare the way for an extension of agricultural instruction and to stimulate an interest in the subject, and the very important work which they have done in laying a foundation of sound agricultural knowledge was a necessary prerequisite to any general movement for the extension downward of agricultural instruction. Knowledge had to be accumulated, extended, and popularized before agricultural instruction below the colleges could become possible. The recent activity of the United States Department of Agriculture in stimulating and encouraging the many efforts looking toward the extension of agricultural knowledge and agricultural instruction have been of great service. The movement has also been greatly aided by the knowledge, which has come to us within recent years, of what European states and nations have been and are doing in agricultural instruction, and the success which has attended their efforts. The work of France in particular has been an inspiration to us. Another influence which has greatly aided the movement has been the growing realization that this nation must, ultimately, be a great agricultural nation, and that our present wasteful and unintelligent methods of agriculture will not do for the future. To find a means of disseminating proper ideas as to how best to conserve and to improve our great national resource has been a strong motive underlying the movement.

Certain movements within the schools themselves have fitted in with and helped to prepare the way for the development of agricultural instruction. The general introduction of nature study into our schools, which came with the popularization of science, has been of very material value in preparing the way and in developing teachers capable of taking up the agricultural work. The still more recent school garden movement (*q.v.*) and the general demand for more practical instruction in the public schools, both elementary and secondary, have also contributed their share in preparing the way for the somewhat general introduction of agricultural instruction. As the movement has grown in importance and definiteness, the far-reaching results, both economic and educational, have come more clearly into view, and the movement has in turn begun materially to change our conceptions of the methods of procedure, purposes, and needs of the rural school and of the high school in particular, and bids fair to modify for good our whole educational work.

Agricultural High Schools. — Schools of secondary grade for theoretical and practical training in agriculture exist in France, Germany, Austria, Sweden, and Japan. The *écoles pratiques* of France, first established in 1875, and of which there are now about 50 in existence, are in reality secondary schools for the training in agriculture of the sons of peasant proprietors or small farmers, and with a two years' course of instruction. In Germany many agricultural schools have been established, beginning at the close of the *Realschulen* course, or at the end of *unter-secunda* of the *Gymnasia* or *Realgymnasia*, in which natural sciences and agriculture take the place of the languages and mathematics of the gymnasial course. In Japan any city, town, or village may establish a secondary school, if the local finances will permit of so doing without detriment to the elementary schools of the place. By 1904 there were 57 such schools in Japan, and the number is increasing every year.

It was thirty years after the establishment of agricultural colleges in this country before the first successful agricultural high school was established. This one, established in 1888, was in connection with the University of Minnesota, and its success was pronounced from the first. By 1898, however, the number of agricultural high schools had only increased to 10, and the teaching of agriculture in the normal schools and the elementary schools of the country had only begun. Since then the development of secondary instruction in agriculture has been much more rapid, though the development has not been so fast as in the case of agricultural instruction in the elementary schools.

To provide instruction in agriculture in the high schools is a very much easier problem than to provide such instruction for elementary schools. The age and mental capacity of the pupils, the nature of the school, and the character of its work and equipment, all tend toward a specialization in subject matter, and specialized agricultural subjects are much better organized and are easier to teach than the more generalized work of the elementary school. The equipment needed, on the other hand, is more extensive, few good textbooks of secondary grade have as yet been provided, just what is to be taught has not as yet been definitely decided upon and put into practice, and the number of properly equipped teachers is relatively small, and probably will continue to be much less than the demand for some time to come.

Statistics collected in May, 1909, showed that the number of agricultural high schools, or colleges offering definite secondary agricultural courses, had increased to 60; that 346 public high schools were teaching agriculture as a part of the high school course ; that 119 state and county normal schools and 16 agricultural colleges were training teachers to teach agriculture in the schools ; that a number of private secondary schools were aiding in the work ; and that 16 institutions offered correspondence or reading courses of secondary grade. In all about 500 institutions were giving secondary instruction in agriculture in May, 1909, and the number has materially increased since then. Some instruction in agriculture is now being added to secondary school courses so fast and in so many parts of the country that it is difficult to know in how many schools and where it is given.

The schools giving secondary work in agriculture may be classified as follows: —

(*a*) Secondary schools of agriculture in connection with the colleges of agriculture. The Minnesota school is of this type, and similar schools of agriculture, or two-year or three-year practical courses, are now maintained in connection with the colleges of agriculture in Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Porto Rico, Rhode Island, South Dakota, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. In addition, a number of the agricultural colleges are giving instruction which is secondary in nature, though it may not be organized as such. The 16 land-grant colleges for the colored race in the Southern states are in large part secondary schools ; their sub-college work representing at least two thirds of their work. These institutions have chosen to produce a large body of practical negro farmers for the South rather than to produce a few highly trained negro experts.

(*b*) Agricultural high schools located in large districts, such as those in Alabama, Georgia, Virginia, and Minnesota. Alabama was the first state to organize such schools, and now has 9, one located in each congressional district. Each school has a branch experimental station connected with it; it is provided with land for experimental and instructional purposes ; has an equipment of buildings, animals, and machinery ; and receives a state appropriation of $4500 a year for maintenance. Georgia has 11 such schools, similarly located. Land, buildings, and equipment were furnished almost entirely by local contributions, and the state grants from the income from fees and taxes about $7500 a year to each school for maintenance. Each school has not less than 200 acres of land. The schools in each state give a four years' course. Other states having somewhat similar schools are California and Minnesota, where one state school is provided ; New York, with three such schools ; Oklahoma, with one such school provided for each of the five judicial districts of the state ; and Virginia, where it is proposed to establish one in each of the ten congressional districts of the state. In Massachusetts a comprehensive scheme of specialized agricultural high schools has been planned by the State Industrial Commission, the plan being to locate ten schools at different places in the state, and to divide the state into ten large agricultural districts. (For a statement of the work of this commission see a special article on MASSACHUSETTS COMMISSION ON INDUSTRIAL AND TECHNICAL EDUCATION.) The district plan is perhaps the best arrangement for such schools, as the state can then be divided into natural agricultural districts, and a school located in each.

(*c*) County agricultural high schools, as in Michigan and Wisconsin. The first of these was established in Wisconsin in 1902, and four are now in existence. These schools are built and equipped at the expense of the counties where located, but the state makes a grant of $4000 a year for each school. The Marathon County school at Wausau, and the Dunn County school at Menomonee were opened in 1902, and similar schools have since been opened at Marinette and Winneconne. The course of study in each is two years in length, and contains much practical and little academic work. There is a county agricultural high school also at Menominee, Michigan ; and Mississippi has recently provided for state aid of $1000 a year to county agricultural high schools, one to be located in each county in the state. County agricultural high schools are also to be found in Maryland. Experience so far seems to indicate that the county is too small a unit for the proper equipment and maintenance of a good agricultural high school.

(*d*) State and county normal schools. Over 100 normal schools in the United States were giving instruction in agriculture in 1909. In some schools a regular course is given by a trained agricultural teacher; while in others the work is done as a part of the science work.

In all such schools the aim of the work is to prepare teachers of the subject for work in the elementary schools.

(*e*) Regular high schools offering instruction in agriculture as a part of their course of instruction. In such schools no uniform plan is followed. In some the work consists of but one or two courses; in others a number of elective agricultural studies are offered; while in still others a regular agricultural course is given parallel with the other courses of the school. In a few schools the work is somewhat limited and specialized along such lines as horticulture or floriculture. Something like 400 schools were offering such instruction at the close of the school year in 1909, and the number has increased since then. In Missouri alone over 200 high schools reported some instruction in agriculture. In some places, and even in some states, the existing high schools are being reorganized so as to make them in large part agricultural high schools. Circular No. 91, Office of Experiment Stations, U.S. Department of Agriculture, gives detailed courses of instruction in horticulture and agriculture, as these have been adopted by the Association of American Agricultural Colleges and Experiment Stations.

(*f*) Private schools or semi-private schools. In this class should be placed the National Farm School, at Doylestown, Pa., established in 1896 to provide instruction and practical form work for about 40 boys; the agricultural department of the Mount Hermon School, near Northfield, Mass., where instruction was begun in 1903; the Smith Agricultural School and Northampton School of Technology, at Northampton, Mass., opened in 1908; the Winona Agricultural and Technical Institute at Winona Lake, Indiana, established in 1902; Tuskegee (*q.v.*) in Alabama; and a number of privately endowed colleges, which afford secondary instruction in agriculture as a part of their work, and nearly all of which are located in the upper Mississippi valley. The schools at Doyleston, Northampton, and Tuskegee also receive some state aid. At Groton, Mass., a school of horticulture and landscape gardening for women has been opened, and a course in horticulture is now given at Wellesley College.

What is the best way to develop secondary instruction in agriculture is as yet a somewhat unsettled question. Whether it is better to aid the present school system to evolve agricultural instruction out of the present work, and thus make agricultural instruction an integral part of the regular school system; or whether it is best to establish special and independent schools for the teaching of agriculture and domestic subjects, — has not as yet been decided. The latter method at present seems to meet with the greatest favor from practical men, but many educators favor the former plan, believing that the inclusion of agricultural instruction into the regular work of the secondary schools, rather than setting it off as a special kind of education for which special and independent schools need to be established, is best for us as a nation. It was this conception of the unity of all education which led to the opposition, from educational workers, to the congressional proposal of 1908 to grant aid from the national treasury toward the establishment of separate secondary schools of agriculture in the different states. It is probable that both types of schools will be needed, and will exist side by side, the larger and more specialized schools being organized for agricultural districts, as was proposed for Massachusetts, and some agricultural instruction being introduced into most of the town and rural high schools.

Agriculture in the Elementary Schools. — Instruction in the elements of agriculture began in Europe long before it began in this country, and in certain European states such instruction is a general requirement for all rural elementary schools and for all training schools for teachers. In France the work is oldest, and is very thoroughly provided for. In 1879 every normal school, and in 1882 every rural primary school, was required to give a place in the course of study to elementary agriculture. For some time the work was indefinite and general, but in 1896 the course of study in agriculture was revised and the instruction made very definite and practical. Since that time progress has been very marked. At the present time agriculture is taught in every rural primary school in France. The work begins with object lessons in the primary grades, changes to nature study of a practical kind in the intermediate grades, and changes further to agriculture and hygiene in the upper grades, with practical exercises in the experimental plot in cultivation, and in grafting. In some departments girls receive the same instruction as boys; in others the courses are partly parallel, but with special emphasis for girls on those aspects of home life and work which in France are the work of women, such as butter- and cheese-making, poultry-raising, and gardening. Almost every rural school has a garden attached to it, where intensive work is carried on. A regular text in agriculture is used. In the higher primary schools a further theoretical course in agriculture is given, and in rural sections, or where demanded by parents, this is further supplemented by practical exercises.

Many other European countries provide instruction in agriculture in their elementary schools. Belgium has one of the best systems of elementary agricultural instruction in Europe. Beginning about twenty years ago, and after the plan of the French, Belgium has since developed an excellent and an individual system of its own. The theory and practices of agriculture, closely adapted to local needs, are now taught in nearly all of the rural primary schools of the kingdom. The course of instruction in all of the state normal schools includes agriculture, and summer agricultural normal schools for the instruction of teachers in service have been held. Germany, Austria, and Switzerland have developed special agricultural schools, rather than general work in agriculture in connection with the elementary schools. In Sweden the elements of agriculture and forestry are taught in all the rural schools, and most of the Swedish schools possess school gardens. The English colonies, in particular the West Indies, Canada, and Australia, have provided for agricultural instruction in certain grades, but in Great Britain little has been done. Japan has recently introduced agricultural instruction into the schools of the empire, and so marked have been the advances that Japan has at present one of the most complete systems of agricultural education to be found. A comprehensive scheme of instruction involving nature study, school gardens, and agricultural instruction is being provided as an integral part of the elementary school system of the empire.

Practically nothing was done toward the introduction of instruction in elementary agriculture in the United States before 1900, but since 1900, and particularly since 1905, very rapid progress has been made. At present the movement for agricultural education is awakening very great interest in all parts of the United States, and many states have included such instruction as a part of the elementary course of study and as a part of the requirements for certificates to teach in the schools. The South and the Middle West have done most in this direction. By October, 1908, Alabama, Georgia, Mississippi, Missouri, Nebraska, New York, North Carolina, South Dakota, Virginia, and Wisconsin had added agriculture to the list of teachers' examination subjects, and agriculture had been added to the list of subjects to be taught in the common schools of Alabama, Arkansas, California, Georgia, Louisiana, Maine, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, South Dakota, Texas, and Wisconsin. The state normal schools in nearly all of these states, and in a number of others, have added courses of instruction intended to prepare teachers of the subject, and the state normal schools of Wisconsin, Illinois, Missouri, Nebraska, and North Dakota have done conspicuous work in preparing teachers of agriculture. Nearly one half of the agricultural colleges of the country have also joined in the movement for the preparation of agricultural teachers, the work of Cornell University, the University of Illinois, Massachusetts Agricultural College, and the Ohio State University being especially noteworthy. The state experiment stations and the national Department of Agriculture have coöperated, many bulletins have been issued by these and by state educational departments, and good textbooks for the use of teachers and pupils are now beginning to appear. No new movements, looking to the vitalizing of the work of instruction in the elementary school, has ever met with so ready a response on the part of the people or been adopted with such ease and such rapidity. There is every promise that the movement will spread until agricultural instruction in some form becomes a part of the course of instruction for the rural schools and small town schools of all of the agricultural sections of the country.

An important accompaniment of the movement, in many places, has been the organization of boys' agricultural clubs, and the interest taken in their work by the farmers themselves. In Iowa, Illinois, Indiana, Kansas, Nebraska, Ohio, and Texas especially noteworthy results have been attained through these clubs. Seeds have been distributed, prize-winning gardens have been planted and cared for, exhibitions of products and judging contests have been held, and deep community interest has been awakened. Farmers' institutes have taken on new life, excursions to agricultural colleges have been run, and special lecturers have been sent out to talk to the boys and girls. In Illinois the college of agriculture arranged a two weeks' course of instruction in agriculture, suitable for boys, and the first premium offered in a number of counties was a trip to the agricultural college to receive this instruction.

As to the nature and content of agricultural instruction for elementary schools there seems to be a somewhat general agreement among students of the subject as to what should and should not be done, though the practice in different states is not always in harmony with the best theory. The main effort in all elementary instruction is to be put on the pupil himself rather than on subject matter, to open his eyes to the vegetable and animal life about him, and to relate him to his environment. To be a good farmer he must be a good naturalist. Good farming demands sensitiveness to the physical environment. The imparting of information about agricultural objects and practices is of little value compared with opening the eyes of the child to the things in nature about him. Whatever agricultural instruction is given must be of a kind that is useful and educative to the child ; subjects are not to be introduced because grown-up farmers think them useful.

The best opinion is that up to the sixth year the instruction in agriculture should be generalized nature study, though closely related to the school environment. After the sixth year the work is to be directed more toward agricultural topics. The plan recommended by the Committee on Industrial Education in Schools for Rural Communities is that the first five years should be devoted to generalized nature study, and that concrete and applied nature study be given in the sixth, seventh, and eighth grades, as follows: first half of the sixth year, the affairs of agriculture;

second half, the soil; seventh year, farming schemes and crops; eighth year, animals; all formal and technical agriculture to be deferred until the high school. The Committee on Instruction in Agriculture of the Association of American Agricultural Colleges and Experiment Stations, which is a high authority in this country on matters relating to agricultural education, recommends a course of instruction consisting of generalized nature study, with school gardens, in the first three grades; nature study with school and home gardens in the fourth, fifth, and sixth grades; and elementary agriculture in the seventh and eighth grades. This committee has prepared a syllabus of a course in elementary agriculture which it recommends for elementary schools (Circular No. 60, Office of Experiment Stations), and a series of exercises in elementary agriculture for the seventh grade in these schools (Bulletin No. 186, Office of Experiment Stations).

E. P. C. and L. H. B.

A fuller discussion of agricultural instruction in the elementary and secondary school will be found under such topics as Gardens, School; Nature Study; and Rural Schools (*q.v.*).

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AGRONOMY. — See AGRICULTURAL EDUCATION; BOTANY.

AHMES. — An Egyptian scribe, Aāhmesu ("the moon-born"), who wrote in the reign of Ra-ā-us (Apepa or Apophis), probably about 1700 B.C. He copied a papyrus written some centuries earlier, entitled *Directions for Obtaining the Knowledge of all Dark Things*, and this copy is still preserved in the Rhind collection in the British Museum. It is the oldest extant manuscript on mathematics, although we have a few Babylonian cylinders containing numerical tables and directions for mensuration. The work is largely devoted to an elaborate treatment of unit fractions. It also gives some crude work in linear equations and in mensuration. A facsimile of the manuscript has been published by the British Museum, and the treatise has been translated into German by Eisenlohr. D. E. S.

AHN, JOHANN FRANZ. — (1796–1865). A German teacher and textbook writer. Born at Aix-la-Chapelle, he first started in business, but soon turned to teaching. From 1843 to 1863 he taught modern languages at the *Realschule* in Neuss, Rhine province. He acquired a great reputation as the author of a textbook for the study of French, *Praktischer Lehrgang zur schnellen und leichten Erlernung der französischen Sprache*, Köln, 1834 (*Practical Method for the quick and easy acquisition of the French language*), which has passed through over 100 editions. His method was widely imitated and applied to the study of English and other modern languages.

AID FOR COMMON SCHOOLS. — See APPORTIONMENT OF SCHOOL FUNDS.

AID FOR HIGH SCHOOLS. — See HIGH SCHOOLS, SUPPORT OF.

AID FOR POOR COMMUNITIES. — See APPORTIONMENT OF SCHOOL FUNDS.

AIDS, VISUAL. — See VISUAL AIDS; APPARATUS.

AIM OF EDUCATION. — See END IN EDUCATION; COURSE OF STUDY, THEORY OF; CULTURE; HUMANISM; NATURALISM; PHILOSOPHY OF EDUCATION.

AIM, STATEMENT OF THE, IN METHOD OF THE RECITATION. — In the contemporary treatment of the method of the recitation, more particularly the "inductive development lesson," a preliminary or sub-step in the lesson procedure, additional to the usual "five formal steps." According to the view of Rein it is a preliminary "step," according to others it is usually a "sub-step" found between the stages of "preparation" and "presentation." Logically speaking, the "statement of the aim" is the equivalent of the "statement of the problem" to be solved, and appears at the beginning of the teaching process in both inductive and deductive lessons. The object of this preliminary "step" is to focus the attention upon the situation to be solved, and to vitalize the situation for the pupils. The "aim" determines the scope of the lesson and the purpose of the teaching.

It frequently occurs that the statement of the "teacher's aim" will vary from that of the "pupil's aim." The "teacher's aim" may be more extensive, including more than one end, and extending over many lesson units. A series of "teacher's aims" and one of "pupil's aims" will, in the long run, tend to coincide. The "pupil's aim" will necessarily be stated in terms that are sufficiently definite, attractive, and pertinent to him, so as to provide an adequate motive for his activity. Any deliberate "aim" stated at the beginning of a lesson, by no means exhausts the purposes or ends which may be properly served during the lesson period. Every lesson acquires supplementary aims provoked by the incidents of the lesson; these are usually, though not always, properly subordinated to the "aim" which initiates the class exercise. There are cases where opportunity provides or demands new aims or motives which may properly supplant those that have been planned. H. S.

See RECITATION, METHOD OF.

AIR OF THE SCHOOLROOM, THE. — If we divide the total number of cubic feet of air in a private dwelling room by the number of persons who occupy it and then make the same calculations with a schoolroom, we see immediately that the conditions which obtain in schoolrooms are unfavorable. Various causes help to contaminate the air in a schoolroom; for example — sundry chemical substances which are unfit to be inhaled again are thrown off from the body by respiration and perspiration, and these two functions also cause additional moisture in the atmosphere, so that the presence of people is alone sufficient cause to render a room warm and "stuffy." Conditions of imperfect health in individuals, such as decayed teeth, also contribute to render the air of a room foul. Children often bring more or less dirt from the streets into the room, containing organic and nonorganic substances; they leave behind in the room minute particles of their clothes, their shoes, their skin; they rub such particles off the surface of the floor, the walls, the desks. Different kinds of artificial lighting also produce gases, moisture, and warmth.

Outdoor air contains 20.94 per cent of oxygen and 0.04 per cent of carbon dioxide (carbonic acid gas), exhaled air 16.03 per cent oxygen and 4.38 per cent of carbon dioxide; if the air which is to be inhaled contained the same proportions of oxygen and carbon dioxide as the air which has been exhaled, interchange of these gases in the lungs would be impossible; therefore the change in the composition of the air is of importance. When children are sitting at their lessons the energy of breathing is not the same as it is when they are moving about, and in sitting still the children always reinhale a good deal of the air just exhaled by them.

Different investigations have been made to find specific noxious (poisonous) substances in the air exhaled. Weichardt has at last found his fatigue toxine in the exhaled air also. We may await the results of further research. The foul smell of air in a crowded room is not in an exact relation to the percentage of carbon dioxide produced by the people in that room, because such odor depends in a large degree upon the cleanliness of the body and clothing. Therefore the maximum of carbon dioxide in a room (in consequence of the presence of people only), as allowed by Pettenkofer, that is to say, 0.1 per cent (one *pro mille*), is a statement not sufficiently based on facts; but we have up to the present time no better means of judging of the deterioration of the air of a schoolroom as far as the proportions of the gases are concerned, and investigations have proved the presence of carbon dioxide in schoolrooms in as large quantities as 14.8 *pro mille*.

The human body has to get rid of a good deal of the warmth which is continually being produced afresh by vaporization, radiation, and convection; and this is a difficult matter in a crowded schoolroom. The Breslau laboratory experiments of Flügge's school have shown that a man inclosed in a case under changing conditions of air felt well if temperature was below 68° and relative moisture below 72 per cent, in spite of the fact that carbon dioxide increased to a large extent; but in highly heated and moist air symptoms like giddiness and so on arose; therefore such conditions should be avoided in crowded rooms. But on the other hand low temperatures would not be good, especially if there are anæmic, feeble children, and air which is too dry is not agreeable for teachers who are obliged to speak for a long time with raised voice.

As to dust, enormous numbers of organic germs have also been found in the air of the schoolroom; the numbers are in general higher, for instance, in old dirty schoolhouses than in new and clean ones; higher if the children are out of poor families and if they move about in the room, and so on; in every case schoolrooms contain many more germs than less crowded rooms. The greatest number of those germs are not at all infectious, but certainly a proportion of them can be malignant. The tender mucous membranes are also liable to be scratched by sharp particles of dust, and by this means an easy entrance for dangerous germs is formed. Teachers often suffer from catarrh of the respiratory organs; pupils from inflammations of the conjunctiva. Dust must be carried away from the respiratory organs by the ciliary motion of certain epitheliums whose power is limited, if indeed they are not already partly destroyed. Therefore introduction, production, and stirring up of dust is to be avoided. (For preserving healthy conditions of air in the schoolroom, see Ventilation and Cleaning.) L. B.

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AIX-MARSEILLES, UNIVERSITY OF. — Whether an educational institution existed in the town of Aix-en-Provence continuously from the Roman period or not is doubtful. It is probable, however, that schools of law and theology existed before the papal bull establishing a *studium generale* was issued in 1409. The faculty of medicine was added some time later. Like other universities of France, the university fell into decay and was closed in 1789. In 1806 Aix-en-Provence became an academy of the Imperial University. In 1896 the university was reëstablished as a state institution. At present only the faculties of law and letters are maintained at Aix itself, while the faculties of sciences, medicine, and pharmacy are conducted at Marseilles. In 1909 there were enrolled 1261 students.

See article on FRANCE, EDUCATION IN.

AKHMIM PAPYRUS. — A papyrus of educational significance, found in Akhmim, in Upper Egypt. It was written in Greek, probably between 500 and 800 A.D. It is on arithmetic, and it treats the subject substantially as it was treated in the Ahmes (*q.v.*) papyrus, written more than two thousand years earlier. The papyrus was first described by Baillet in 1892. D. E. S.

ALABAMA AGRICULTURAL AND MECHANICAL COLLEGE, NORMAL, ALA. — An institution organized in 1875 for negroes, with an annual appropriation of $1000 and a faculty of two teachers. In 1882 through self-sacrifice of the teachers a lot was acquired and buildings were erected by Huntsville. Industrial work was added to the literary. In 1885 the legislature appropriated $4000 a year and made the institution the Industrial School for the negroes of Alabama. In 1891 the school received a share in the endowment given by Congress "for the benefit of agriculture and mechanic arts." The property of the school was sold and the school removed to a more accessible site four miles from Huntsville. Ten large buildings and 6 small ones, including a Carnegie Library, have been erected with a barn and dairy, while some older buildings on the site were retained and renovated. The college receives state and federal aid. The institution aims to give "instruction in agriculture, the mechanic arts, English language, and various branches of mathematical, physical, natural, and economic science with special reference to their application in the industries of life." The industrial work is turned to the advantage of the college. In addition to the schools of Mechanic Arts and Agriculture, there are schools of Music, Domestic Science, Business, Biblical Literature; the Scientific-Literary, Normal, and Preparatory schools. The college confers degrees. The value of the grounds is $10,000; the buildings $75,000; equipment $15,000. The total annual income is $15,000. There are 10 professors, 4 assistant professors, and 25 instructors and assistants. The average salary of professors is $556 a year. W. H. Councill, Ph.D., is the president.

ALABAMA BAPTIST COLORED UNIVERSITY, SELMA, ALA. — The outcome of a proposal made by the Colored Baptist State Convention of Alabama in 1873 to establish a theological school; not opened until 1878 at Selma, as "The Baptist Normal and Theological School." The property is now worth about $75,000. The total annual income from tuition and denominational contributions is $17,000. There is a faculty of 19 teachers. Literary, theological, and industrial courses are offered. About seven units are required for admission. Degrees are conferred in the college and theological courses.

ALABAMA BRENAU COLLEGE, EUFAULA, ALA. — A school for the higher education of women, opened at Eufaula in 1854 as the Union Female College. It was reopened under its present title, in 1905, after a period of decline. The college is maintained by fees and contributions from citizens of Eufaula. The institution confers degrees, although the entrance requirements hardly represent more than five units. There are 10 instructors.

ALABAMA CENTRAL FEMALE COLLEGE, TUSCALOOSA, ALA. — An institution for the higher education of women, established in 1858. In addition to a Collegiate Department, there are also Sub-Collegiate, Music, Art, Elocution, and Business departments. Although the entrance requirements are vague, degrees are conferred after a four years' course. There are 11 instructors.

ALABAMA CONFERENCE FEMALE COLLEGE, TUSKEGEE, ALA. — An institution for the higher education of women, founded in 1854 and opened in 1856 as the Tuskegee Female College. The Board of Trustees is nominated by the Alabama Conference of the Methodist Episcopal Church, South. The plant is valued at $125,000. Degrees and diplomas are conferred; four to eight points of high school work are required for admission to collegiate department. There is a faculty of 11 professors and 2 associate professors.

ALABAMA NORMAL COLLEGE, LIVINGSTON, ALA. — A coeducational institution since 1900; the normal department was opened in 1883 with an annual state appropriation of $2500, gradually increased up to $15,000 in 1907. Pupils admitted at the age of 14; 16 for first-grade certificate. Tuition is free except for special lessons in music and art, provided the pupils on graduation enter the teaching profession. Diplomas are awarded in normal classical, normal English, and professional courses. A four-year course is offered in the normal school. There is a faculty of 14 teachers.

ALABAMA POLYTECHNIC INSTITUTE, AUBURN, ALA. — A state college for the benefit of agriculture and the mechanic arts established by the state in 1872 with an endowment from the land grant appropriation made by Congress in 1862. The institution is open to women. The Board of Trustees consists of the Governor and State Superintendent of Education, *ex officio*, and ten members from nine congressional districts, appointed by the Governor with the consent of the Senate. Courses are offered in academic, engineering and mines, and agricultural science departments. There is an annual appropriation from the state of about $30,000. The plant includes 8 buildings. In 1908–1909 there were enrolled 700 students. Candidates are admitted at 15 years of age by examination or certificate from approved schools with supplementary examination where necessary. About seven units are required for admission. The faculty includes 22 professors, 5 associate and assistant professors, and 12 instructors.

ALABAMA, STATE OF. — First organized by Congress as a part of the Territory of Mississippi in 1798. Organized as the separate Territory of Alabama in 1817, and admitted to the Union as the twenty-second state in 1819. It is located in the South-Central Division, and has a land area of 51,540 square miles. In size it is about as large as Arkansas, or Wisconsin, and a little larger than the state of New York. For administrative purposes the state is divided into 67 counties, and these in turn into cities and school districts. In 1900, Alabama had a population of 1,823,697, and a density of population of 35.5 per square mile. Its estimated population in 1910 was 2,143,993.

Educational History. — The first constitution of Alabama, adopted at the time of the admission of the state into the Union, declared that "schools, and the means of education, shall be forever encouraged in this State." This mandate of the constitution remained ineffective for a long time. Nothing whatever was done toward carrying it into effect before 1826, when the first school law, special in its nature and applying only to Mobile, was adopted. For the next 28 years the history of education in Alabama is the history of the schools of Mobile.

The first attempt to organize a system of schools for the state as a whole was made in 1854. A Superintendent of Education for the state, three Commissioners for each county, and Trustees for each township were provided for. An appropriation of $100,000 annually was made from the treasury, to be added to the interest arising from the school fund, which fund in 1855 amounted to $74,687.60. By 1856, reports show that 2260 schools were kept, with an average of six months of school. None of these schools were free schools, however, and few were real public schools, the common practice being to grant private teachers a part of the public funds to enable them to lower their tuition charges or to prolong their term. In 1857 the total income for schools was $281,847.41, but this was only 50 per cent of the amount expended, the remainder being made up from contributions and tuition fees. In 1856, County Superintendents of Schools were substituted for the County Commissioners. A few other advances were made during the next few years, but the Civil War put an end to this school system.

A provisional constitution was adopted in 1865, which contained about the same educational provisions as those found in the constitution of 1819, but no schools were organized under its authority. In November, 1867, the office of Superintendent of Education was abolished, and the duties of the office were performed by the State Comptroller until July, 1868. The constitution of November, 1867, which went into operation in July, 1868, made very definite provisions for a highly centralized state school system. A Superintendent of Public Instruction and a State Board of Education were provided for, the latter to meet annually and to have independent authority to legislate for the schools. One fifth of the annual revenue of the state, and certain corporation taxes, were to be devoted entirely to the support of the schools, and schools were to be free to all children of the state between the ages of 5 and 21. Between 1868 and 1875, the annual appropriations averaged a little over half a million dollars a year, and the number of schools was increased to 3898 by 1874, though the revenues were not sufficient to maintain more than about three and one half months of school.

In 1875 a new constitution was adopted which radically changed the nature of the school system, and established one much more in harmony with what the people of the state desired. The State Board of Education with legislative authority was abolished; for the definite percentage of the state's taxes required for schools an annual appropriation was substituted; the title of Superintendent of Education was restored; separate schools for the two races were made mandatory; aid to sectarian and denominational schools was forbidden; and the independent status of Mobile was perpetuated by exempting Mobile County from the operation of all school laws except those relating to the apportionment of school funds, the making of school reports, and the maintenance of separate schools for the two races. The legislation of 1875–1876 carried these provisions into effect. Teachers' Institutes were organized in 1875, and in 1879 the examination of all teachers was required for the first time. As late as 1872 it was estimated that one third of all money for the schools still came from donations and subscriptions.

In 1901, a new constitution was adopted which continued most of the educational provisions of the constitution of 1875, but changed the method of state aid from an annual appropriation to a state tax of 30 cents on the $100, authorized the voting of a county tax of 10 cents, and reaffirmed the independent position of the schools of Mobile. In 1901 a state system for the examination of teachers was substituted for the previous unsatisfactory county systems. In 1903 a law providing for the adoption of a state series of uniform textbooks, a law substituting school districts under a centralized county system of administration for the previous less-centralized township system, and a law making the county the unit in the apportionment of school funds by the state, were adopted. In 1907 a permissive county high school law, by which state aid may be given to such schools as may be formed, and a law known as "The Rural School House Act," by which $67,000 is appropriated annually to help rural districts in building and repairing rural school houses, were enacted.

Present School System. — The school system of Alabama as at present organized is as follows: At the head of the system is a Superintendent of Education, elected by the people for four-year terms, and ineligible as his own successor. His salary is $3000 per year. He has general supervision of the schools of the state; apportions the state school fund to the counties; prepares all blanks and forms used; must visit the counties and hold at least one institute in each congressional district each year; must report annually to the Governor; approves the monthly pay roll of each county, and remits the state money accordingly; approves all grants for aid in building and repairing schoolhouses and all plans for new school buildings; and signs all teachers' certificates and revokes the same for cause. He is also president of the State Board of Examiners, has charge of the sale and preservation of all school lands, and is a member of the State Text-Book Commission, the State High School Commission, and of the Board of Trustees for the state university and the different state institutions.

For each county there is a County Superintendent of Education, also elected by the people for four-year terms, who receives as salary 4 per cent of all state school money disbursed by him. He oversees the schools of his county, keeps all records, looks after the school funds and lands, pays all teachers except in cities, and reports to the Superintendent of Education for the state. Each county also has a County Board of Education, consisting of the County Superintendent of Education and four others elected by the Chairmen of the District Boards of Trustees, not more than one of whom shall be a teacher. This Board holds the title to all school property, employs all teachers for the school districts of the county, and has entire control of the public schools of the county, subject only to the provisions of the school law. Their compensation is limited to $20 a year.

For each school district three School Trustees are elected for four-year terms. They are required to take the school census; care for the school property; nominate teachers for election by the County Board of Education; visit the schools; and make reports to the County Superintendent. The independence of the combined city and county of Mobile is provided for in the constitution and the law, and cities of 6000 inhabitants or over are given similar privileges, except in the matter of textbooks. Smaller cities and towns are governed by Boards of Education, but are subject in all matters to the general school law. A State Board of Examiners examines all candidates for teachers' certificates, including all graduates from the state normal schools, and issues all certificates to teach in the schools of the state. A State Text-Book Commission adopts uniform textbooks for the schools of the state, on five-year contracts.

School Support. — The state originally received 902,744 acres of land from the sixteenth section grants made to the states by Congress for schools. The first state constitution, adopted in 1819, directed that the legislature should preserve these lands and apply the funds "in strict conformity to the object of such grant." By 1855 the sum of $1,244,793.36 had been realized from the sales of this land. The state also received $669,089.78 from the U.S. Surplus Revenue Fund (*q.v.*) deposited with the states in 1837, all of which was put into the permanent school fund. There have been some losses and some additions, the total value of the permanent school fund being $2,135,313 when last reported. The annual state appropriation for education consists of the interest on these funds, at the rate of 6 per cent on the sixteenth section fund and 4 per cent on the Surplus Revenue fund; all rents and incomes from the school lands; escheats; poll taxes (retained in the county where paid); certain license taxes; the sum of $350,000 from the treasury of the state; and the state school tax of 30 cents on the $100 authorized by the state constitution. About 70 per cent of the expenditure for education at present comes from state sources. All state money is apportioned to the counties solely on the basis of the number of children between the ages of 7 and 21. Within the county all state and county money must be distributed in such a manner as to provide "as nearly as practicable, school terms of equal duration," and the state money can be used only for teachers' salaries. About two thirds of the counties also vote the one-mill tax authorized by the constitution of 1901. Local district taxation has not as yet been authorized.

The total amount expended for schools during the last year for which reports are available was $2,620,355. Based on the total population of the state this was equal to a per capita expenditure of $1.26 a year, the state standing third from the bottom of the list, Mississippi and South Carolina alone being lower. The average daily expenditure per pupil was 9.3 cents and the total yearly expenditure per pupil in average daily attendance was $10.52. From the bottom of the list Alabama has recently raised itself to sixth place in these items. In the amount raised per child 5–18 years of age ($3.30), the state stands third from the bottom of the list, the average for the United States as a whole being $15.52. The relative poverty of the state and the large number of children are evident from the fact that it takes $1.47 from each adult male to raise $1.00 for each child, 5–18 years of age, an amount exceeded by but four states, and against an average for the United States as a whole of $1.02. In the total amount of school money raised per adult male of the total population ($4.87), Mississippi, with $4.84, alone was lower, and the average for the United States was $15.79. These figures reveal the meager equipment, the relative poverty, the large numbers of children, and the low expenditure for education in the state. The state has made much progress within the past five years, the expenditure in most items having almost doubled during that time.

Educational Conditions. — Of the population in 1900, 45.2 per cent were negroes, and 99.2 per cent were native born. In one third of the counties the negroes outnumbered the whites, in one sixth of the counties they outnumbered the whites three or more to one, and in six counties they outnumbered the whites more than five to one. The relative increase in the two races between 1890 and 1900 was 20.1 per cent for the whites and 21.9 per cent for the negroes. Of the total population, 33.4 per cent are between the ages of 5 and 18, a percentage exceeded by but five states, the highest being South Carolina with 34.6 per cent, and the average for the United States being 28.3 per cent. The state is essentially rural and agricultural, as 88.1 per cent of the population lived in country districts and only 7.3 per cent lived in cities of 8000 inhabitants in 1900.

The average length of term provided in Alabama was 113.3 days. North Carolina, South Carolina, Florida, and Arkansas alone provided less, the lowest being Arkansas with 93.9 days. Of the school population, 5–18 years of age, 55.77 per cent were enrolled in the public schools. Louisiana with 49.26 per cent alone enrolled a lower percentage in the public schools, while the average for the United States was 69.32 per cent. Of the number enrolled but 64.44 per cent was in daily attendance, the state standing eleventh from the lowest in this respect. This was equal to an average daily attendance of 73 days for each child enrolled and of 40.7 days for each child in the state, 5–18 of age, as against 75.7 and 49.0 days for the South-Central Division and 109.8 and 76.1 days for the United States as a whole. No statistics are available to enable one to separate the above percentages for white and for colored schools.

The state has no compulsory attendance law, and no means of enforcing one or of regulating truancy are provided. In 1903, a child labor law was enacted, and in 1907 this was revised and made effective. Children under 12 are forbidden to work in mills or factories, and children are permitted to work between 12 and 16 only after 8 weeks of attendance at school. Hours and conditions of labor are defined, penalties are provided, and the inspector of jails and almshouses is charged with the duty of enforcing the law.

According to the census of 1900, the percentage of illiterates in the total population, 10 years of age and over, was 34.0 per cent. The percentage of illiteracy among the colored population was 57.4 per cent.

In material conditions the schools of the state make little better showing. As local taxation has not been authorized as yet, schoolhouses and repairs must be provided for by donations and subscriptions. Despite rapid advances within recent years, about one third of all the school buildings in use for public school purposes are still owned by individuals, and the estimated average value of all school buildings in use is only about $450. The Rural School-House Act of 1907, whereby $67,000 annually, or $1000 for each county, is appropriated to be spent under the direction of the Superintendent of Education, to assist rural communities to obtain better school buildings, will in time do something to relieve the present objectionable conditions. The rural schools of Alabama, however, leave much to be desired, being taught for but a short time and by poorly paid teachers, and having practically no teaching equipment with which to work. The elementary school system, as a whole, is just now in the process of being rounded out and classified, but the work is slow, due in large part to the inertia developed by a period of fifty years under the old conditions. Agricultural instruction and temperance physiology are required to be taught in all the schools of the state, but little else than these and the staple elementary school subjects is provided in any of the schools. But 9 schools in the state are listed as offering manual training.

Teachers and Training. — The state employed 7757 teachers at the date of last report, about one third of whom were men, and about one third were colored. As nearly as can be calculated from the very imperfect statistical tables available, the average yearly salary for all teachers, based on the average monthly salary and the average length of term, was approximately $200 a year for men and $150 for women, and about $240 a year for teachers in white schools and $100 a year for teachers in colored schools. No statistics are available from which the percentage of teachers who have had any kind of professional training can be calculated, but something of the professional status of the teaching force can be determined from the fact that 55 per cent of the white teachers and 58 per cent of the colored teachers were teaching on a third-grade certificate, based on a written examination in spelling, reading, writing, grammar, arithmetic through fractions, primary geography, and the elementary principles of hygiene, physiology, and agriculture. Life diplomas, based on six years of successful teaching on a first-grade certificate, are held by 3.5 per cent of the white teachers and 7 per cent of the colored teachers. As a means of improving the teachers in service 250 teachers' institutes are held in the different counties each year. The state maintains 7 state normal schools for the training of teachers for the state, as follows:—

Name	Location	In Training Course	Grads. in 1908
State Normal College	Florence	352	26
State Normal College	Troy	261	22
State Normal School	Jacksonville	400	21
State Normal School	Daphne	20	6
Alabama Normal College	Livingston	275	12
Falkville Normal College	Falkville	26	0
Agricultural and Mechanical College for Negroes	Normal	129	24

In addition to the above there are 3 private normal and industrial colleges, 2 of which are for the colored race, including the widely known Tuskegee Normal and Industrial Institute (*q.v.*), at Tuskegee.

Secondary Education. — Graded schools have been organized in the towns and cities, but a high school system for the state is as yet to be developed. The last available report shows that there were 8 public high schools in cities of 8000 or over, and 111 public high schools of all kinds in the different towns and districts of the state. In addition to the above 21 private high schools are reported. Three public high schools and 11 private high schools exist in the state for the colored race. The work done in nearly all of the high schools is only in part secondary work, as is shown by the presence of many elementary pupils and by the low entrance requirements of the colleges of the state. The high school law of 1907 provides for the ultimate placing of a good high school in each county, but it rests with the Governor to put the law into operation, and this is to take place when in his judgment the conditions of the treasury will permit. A site, building, and equipment, costing not less than $5000 must be provided locally and deeded to the state, after which the state will make an annual appropriation of $2000 for teachers' salaries. The 7 public normal schools, the 9 agricultural high schools, the state industrial school for white girls, and the high schools in the cities, form the chief agencies for secondary education in the state. With the development of its agricultural and natural resources, the coming of railways and manufactories, and the consequent largely increased expenditure for education on the part of the people of the state, educational conditions may be expected to improve rapidly in the future. But it will require years to overcome the handicap under which the state now labors.

Higher and Technical Education. — The University of Alabama, opened in 1831, and the Alabama Polytechnic Institute at Auburn, opened in 1872, stand as the culmination of the public school system of the state. The Agricultural and Mechanical College for negroes at Normal offers agricultural and technical instruction for the colored race. In addition to these state institutions 13 denominational colleges, 2 of which are for the colored race, supplement the higher instruction offered by the state. The colleges are as follows: —

College	Location	Opened	Control	For
For White Race				
Spring Hill College	Spring Hill	1830	R. C.	Men
Judson College	Marion	1839	Bapt.	Women
Howard College	East Lake	1841	Bapt.	Men
Athens College	Athens	1843	M. E. So.	Women
Alabama Brenau College	Eufaula	1854	Non.Sect.	Women
Alabama Conference Female College	Tuskegee	1856	M. E. So.	Women
Alabama Central Female College	Tuscaloosa	1858	Bapt.	Women
Southern University	Greensboro	1859	M. E. So.	Both Sexes
Tuscaloosa Female College	Tuscaloosa	1860	M. E. So.	Women
St. Bernard College	St. Bernard	1892	R. C.	Men
Alabama Synodical Col. for Women	Talladega	1903	Presby.	Women
For Colored Race				
Talladega College	Talladega	——	Cong.	Both Sexes
Stillman Institute	Tuscaloosa	——	S. Presb.	Men

Special Institutions. — The most noteworthy special institution maintained by the state is the Alabama Girls' Industrial School at Montevallo, which offers courses similar to those given in the better high schools, and in addition instruction in art, domestic economy, dairying, and manual training. Almost equally noteworthy are the 9 agricultural high schools maintained by the state, one in each congressional district, which serve as preparatory departments for the University of Alabama. These offer a good high school course, with instruction in agriculture. The state also maintains the Alabama School for the Deaf, the Alabama School for the Blind, and the Alabama School for Negro Deaf and Blind, all located at Talladega; and the Alabama Industrial (reformatory) School at East Lake.

E. P. C.

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ALABAMA, STATE UNIVERSITY OF. — Founded in 1819 through a donation of 72 sections made by Congress for the "endowment of a seminary of learning." In 1820 the title "University of Alabama" was adopted. Tuscaloosa was selected as the seat of the university in 1827. Rev. Alva Woods, D.D., was the first president. The old buildings were destroyed in 1865, and new buildings were erected in 1867 and instruction resumed in 1869. In 1884 Congress made a second donation of 72 sections of public lands. In 1907 the Legislature of Alabama voted $400,000 as a fund for erecting new buildings during 1907–1910, and increased the annual maintenance fund to $25,000. In the same year the Medical College of Alabama (founded 1859) at Mobile became a part of the university, and $45,000 was appropriated to it for new buildings and equipment and an annual sum of $5000 for maintenance. The Board of Trustees consists of the Governor and State Superintendent of Education, *ex officio*, and one member from each of the congressional districts except that in which the university is located, which has two members. The university maintains six departments for academic instruction, education, engineering, law, medicine, and pharmacy, and since 1904 a summer school for teachers. Admission is either by certificate from affiliated schools and the first-grade state certificate as teachers in the public schools of Alabama with an examination in subjects not covered by the certificate, or by examination. Twelve units, to be raised to fourteen in 1910–1911, are required for admission. English, mathematics, and history must be included, and no student who is conditioned in more than four units is admitted. Degrees are conferred at the end of a four years' course. The university grounds at Tuscaloosa cover nearly 300 acres, including a campus of 40 acres. There are 9 college buildings. The university library contains 20,000 volumes and a large number of pamphlets; there is also a valuable natural history collection. There were, in 1909, 884 students, divided as follows: 284 in the academic department, 48 in engineering, 69 in law, 74 in medicine and 19 in pharmacy, 293 in summer school. There is a faculty of 30 professors, 28 instructors, lecturers, and assistants. T. W. Abercrombie, LL.D., D.C.L., is the president.

ALABAMA SYNODICAL COLLEGE, TALLADEGA, ALA. — An institution for the higher education of women, founded in 1903 by the Presbyterian Synod of Alabama. While the entrance requirements are not definitely stated, the institution grants degrees on a four years' course. Primary and preparatory departments are maintained, as well as a conservatory of music and art. There are 10 instructors.

ALASKA, EDUCATION IN. — The first school in Alaska was established on Kodiak Island in 1784 by Gregory Shelikof, the founder of a Russian trading company. In 1799 the Russian-American Fur Company was required to establish schools in connection with its trading posts. In these schools, especially at Sitka, the half-breed young men were trained as mechanics and bookkeepers, and as masters of its vessels, and a few half-breed native girls were trained as housekeepers. Mission schools of the Russo-Greek Church educated a few young half-breed men as priests. The native population as a whole was not reached by this system of education, which was discontinued about 1850.

In 1877 the first American schools were established in connection with Presbyterian missions among the natives through the agency of Dr. Sheldon Jackson. The act providing a civil government for Alaska, 1884, directed the Secretary of the Interior to make proper provision for the education of white and native children. In March, 1885, this duty was assigned to the United States Commissioner of Education, who conducted the schools for both white and native children under annual appropriations from Congress until 1900, when Congress authorized the incorporated towns to assume the support and control of their white schools. In 1905 the schools outside of incorporated towns were placed under the supervision of the Governor of the District, who was made *ex officio* superintendent of public instruction. Both the schools in incorporated towns and outside of incorporated towns are managed by local boards of three members each, elected by the people; both classes of schools are supported from the moneys received from liquor, occupation, and trade licenses, the former getting one half the income received from this source within the incorporated towns, and the latter one-fourth of the amount received outside the incorporated towns. The only duties of the Governor regarding schools which are expressed in the statutes have to do with the apportionment of these moneys among the latter class of schools; no supervision has been exercised by him over the schools in the incorporated towns.

In 1908–1909 there were 10 schools in incorporated towns and 19 schools outside of incorporated towns. The latter were maintained at a cost of $40,762, the enrollment being 684. No statistics are available regarding the former. Schools are usually maintained for nine months in all towns. The largest towns maintain graded schools, including high schools, some of which are of high grade. The schools in the incorporated towns are well housed and well equipped. The contrary is usually the case in the other schools, most of which have but a single teacher, none having more than three. The average salary of teachers is slightly above $100 per month, the entire range being from $80 to $175.

The educational system for the natives, under the Commissioner of Education, was entirely reorganized and greatly extended during 1907–1910. The education of the inferior races is conceived as meaning the advancement of both adults and children in civilization. Four main objects are sought: (1) the development of the native industries and of the industries of civilization to which the natives are adapted; (2) improvement in the domestic arts; (3) the establishment of sanitary conditions in the native villages and the promotion of hygienic living; (4) the inculcation of moral principles. Only slightly less emphasis is placed upon instruction in the elementary school subjects. The schoolhouse in each village is regarded as a social center for the accomplishment of practical ends. These houses contain the schoolroom, industrial room, kitchen, bath, and the living quarters of the teachers.

In the school year 1909–1910 the school service embraced 78 stations, with 6 superintendents, 96 teachers, 17 physicians, 5 of whom served also as superintendent or teacher, and 3 instructors in sanitation and hygiene. During 1908–1909 the school enrollment in 69 stations was 3809 and the average attendance 1521; 89 teachers made 11,540 visits to homes of natives and received 28,583 visitors; 77 of these teachers rendered medical attendance, during the absence of physicians, 9107 times. Since July 1, 1907, the annual appropriation of Congress for this service has been $200,000.

Alaska Reindeer Service. — One of the most notable achievements in the history of the education of inferior races is conducted by the United States Bureau of Education as a part of its educational system for the natives of Alaska. By the distribution of domestic reindeer imported from Siberia among the natives in accordance with a plan which is fundamentally educative in character, a threatening economic danger has been removed, and a new industry, higher in the ethnological scale, has been established through which the Eskimos are advancing rapidly into a higher civilization.

The Service, which was inaugurated in 1892, is conducted under rules and regulations approved by the Secretary of the Interior, which provide for the distribution of reindeer to natives as reward for apprenticeship, in return for services rendered outside apprenticeship, and by purchase. Whites may acquire male deer by purchase. Distribution occurs mainly through apprenticeship, during which a boy not only acquires the art of deermanship, but also receives instruction in the elementary English subjects, in the keeping of accounts, in the marketing of reindeer, and in the purchasing of supplies, during periods of short attendance at the regular schools, and also from traveling teachers at the reindeer camps. If his record is good, he receives at the end of each year from 6 to 10 reindeer, and at the close of the fourth year becomes a herder. Later he is required to take on apprentices. The Lapps, who were originally employed as instructors in deermanship, have now been largely succeeded by Eskimos. Since 1907, the government by a large increase in the number of its reindeer stations has taken the prominent part formerly held by the missions in the distribution.

On June 30, 1909, there were 18 government and 10 mission stations, and 22,915 reindeer, 19 per cent of which were owned by the government, 17 per cent by the missions, 14 per cent by the Lapp herders, and 49 per cent by 260 natives. In consequence of the Bureau's policy of eventually turning over all its reindeer to the natives, the percentages of government and mission reindeer are gradually decreasing, while the percentage of reindeer owned by the natives has increased 8 per cent and the number owning reindeer has increased 128 per cent since 1907.

The reindeer furnish the natives with meat and milk for food, skins for clothing, and sinew for sleds and other implements; 800 sled deer provide transportation for passengers and freight. In addition the natives have the income from the sale of reindeer products and from freighting, which during the fiscal year 1909 amounted to almost $18,000. Some Eskimos maintain bank accounts. Twenty-five Eskimos own herds of over 100 reindeer, ranging in value from $2500 to $20,000 each. H. V.

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ALBANY, CITY OF. — The capital city of the state of New York. In 1900 the city had a population of 94,151, and in 1910 its estimated population was 100,253. Its school census, 5–18 years of age, was 16,688 in 1908, and its total day school enrollment was 12,572. The enrollment in private and parochial schools was 5398 additional, and is increasing, while the total of public school enrollment is decreasing. Nineteen per cent of the population of 1900 was foreign-born, German, Irish, and English being the predominant races. Only 1.2 per cent were negroes.

A Board of Public Instruction was first organized by law for Albany in 1866, and a City Superintendent of Schools was employed the same year. The Board of Public Instruction was reorganized in 1892, and again in 1902, when its name was changed to the Board of Education. The board consists of three members, appointed for six-year terms. The Superintendent of Schools holds office on an indefinite tenure. The city employed 316 teachers and 28 supervisory officers in 1907–1908, and provided a school term of 180 days in day schools and 87 evenings in evening schools; 29 teachers were employed in kindergartens, 50 in evening schools, and 36 in the high school. Of the teachers employed, 313 were women, 213 were graduates of the Albany high school, and 172 were graduates of the City Training School. The total expenditures for current expenses in 1908–1909 were $370,270. The city maintains 22 day elementary schools, with kindergartens attached, 4 elementary evening schools, 1 day and 1 evening high school, and a teachers' training school with a two years' course beyond the high school for the purpose of training teachers for the elementary schools of the city. An ungraded school is provided, and a compulsory attendance officer employed. A teachers' retirement fund went into operation Jan. 1, 1908. A vocational school was added in 1909, taking pupils from the elementary schools at the age of 13 or 14 and giving a course of from two to four years. The length of the full course is four years. The first two years are devoted to general mechanical training, and in the last two years the studies are more specific in character, with application of subject matter to the industries of Albany and its vicinity. The purpose of the school is largely industrial and technical.

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ALBANY COLLEGE, ALBANY, ORE. — A coeducational institution founded in 1866 and placed under the control of the Presbyterian Synod of Oregon, which elects the Board of Trustees. Financial support is given by the synod, the city and community of Albany, and the College Board of the Presbyterian Church. All students are expected to attend chapel daily and to devote one hour a week to Bible study. Academic, collegiate, commercial, and musical departments are maintained. Approximately three years' high school work is required for entrance. The B.A. degree and the B.Ped. in the Normal course are given. The majority of the students attending are in the music department. There are 7 professors and 5 instructors and assistants.

ALBERT COLLEGE, BELLEVILLE, ONTARIO. —A coeducational institution of preparatory grade under the auspices of the General Methodist Conference, giving courses preparing for matriculation for the universities, business courses, and courses in fine arts.

ALBERT LEA COLLEGE FOR WOMEN, ALBERT LEA, MINN. — An educational institution for women, founded in 1884 by the Synod of Minnesota. An academy giving preparatory training is attached to the college. Fifteen units of academy or high school work are required for admission to the freshman class in the college. Classical, semiclassical, and scientific courses are offered, with a minimum of electives. Departments of fine arts are also maintained. Degrees and diplomas are conferred. Graduates of the college receive state certificates to teach in the high schools after one year's service. There is a faculty of 17 instructors.

ALBERT OF YORK. — (*c.* 710.) Schoolmaster and Archbishop of York. As master of Alcuin, the most famous educator of his age, whose fame is greater in France and Germany even than in England, it is fortunate that Albert's own merits have been sung by Alcuin himself. Albert, or Ethelbert, a relation of his predecessor Egbert, who was himself brother of the reigning king of Northumbria, was brought up in York Minster. He became deacon and priest when quite young; was made Defensor Cleri, an office much like that of the later official of the Court of York or bishop's chancellor. "At the same time he was preferred as master in the city. There he gave to some the art of the science of grammar, pouring on others the rivers of the tongue of orators; these he polished on the whetstones of law, those he taught to sing together in Æonian chant, making others play on the flute of Castaly, and run with the feet of lyric poets over the hills of Parnassus." But grammar, song, and rhetoric were not all. He taught the music of the spheres, the use of the globes, and natural history. "Others the said master made to know the harmony of heaven, the labors of sun and moon, the five belts of the sky, the seven planets, the laws of stars, the rising and falling of the wind, the movements of the sea, the earth's quake, the nature of men, cattle, birds, and beasts," "the divers kinds of numbers, and various shapes." He even taught arithmetic and Euclid. He was versed in the calendar and ecclesiastical arithmetic. "He gave certainty to the solemnity of Easter's return." Above all, he taught theology. His school was not merely a day school, "whatever youths he saw of eminent intelligence, those he joined to himself, he taught, he fed, he loved." Alcuin's biographer tells us that Helbercht, as he calls Albert, had round him "a flock of scholars from the sons of gentlemen (*nobilium*)," some of whom were instructed in the rudiments of the art of grammar, others in the learning of the liberal arts, and some in the divine writings. He traveled abroad and went to Rome, and on his return became archbishop. The cathedral, with thirty chapels and thirty altars, was rebuilt by his two pupils, Eaubald and Alcuin, under

Albert's directions, and was consecrated ten days before he died. He had handed over the archbishopric to Eaubald two years before his death, and retired into private life. He is the first book collector recorded in England. The school and the books he gave to Alcuin himself, who gives a poetical catalogue of them, which comprised only some half dozen authors who would now be called classical: Vergil, Statius and Lucan, Aristotle and Cicero; but a large number of grammarians, ten Fathers, and Aldhelm and Bede, who had only recently died. But as the catalogue ends with saying that the rest are too long to write, we may perhaps credit Albert with many more. At all events, he was a remarkably learned man for his age, and showed that he was a great educator by the affection which he inspired in the pupils who commemorated him. A. F. L.

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ALBERTA, EDUCATION IN. — See Canada, Education in.

ALBERTUS MAGNUS,— called the "universal doctor" because of the breadth of his knowledge, which rendered him perhaps the most learned of all the medieval schoolmen, — was born perhaps in 1193 at Lauingen in Swabia and died at the ripe age of 87 years at Cologne. Albertus had already been well educated both in Paris and Padua when he entered the order of the Dominican friars, in 1223. Subsequently he studied at Bologna, and taught both at Cologne and Paris. Nor were his activities limited to the scholastic field. The greatness of his reputation as an exponent of Peter the Lombard, Aristotle, and Averröes caused administrative duties to be put upon him. He served as Provincial of his order in Germany, then as Grand Master of the Palace to Pope Alexander IV, and finally, in 1260, as Bishop of Ratisbon. He assisted at the famous Council of Lyons, but his heart was rather in quiet studies and in his teaching at Cologne. Albertus was skilled in the science of his day, a prolific author of 21 folio volumes, a realist in philosophy, a follower but not a slavish imitator of Aristotle, a bold and discriminating theologian, and a master of dialectical method. His influence on the Church has been less than that of Thomas Aquinas, but his *Summa Theologiae* and commentary on the *Book of Sentences* are among the great literary achievements of medieval scholasticism. P. R. C.

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ALBERUS, ERASMUS.— (*c.* 1500–1553.) A German pastor and schoolmaster. Born in Sprendlingen, he became teacher in Ursel, and afterwards general superintendent of the churches of Brandenburg. He is the author of a Latin-German dictionary, a book on morals, and a number of pedagogic writings, in which he opposes the barbarous methods of corporal punishment used in the schools of his time.

ALBION COLLEGE, ALBION, MICHIGAN. — A coeductional institution, the movement to establish which was begun in 1833 by three clergymen of the Methodist Episcopal Church. In November, 1843, the first building was opened; in 1849 the charter was amended to provide for the inclusion of a women's college, and the corporate name became "Wesleyan Seminary and Female College Institute." In 1861 this institution became Albion College, and was authorized to confer degrees. In addition to the College of Liberal Arts, admission to which is by examination or certificate from an approved high school, the college maintains a Conservatory of Music, a School of Painting, a Business Department, and a Preparatory School. A modified elective system of studies is in effect. The degree of M.A. is given for graduate study. The institution has established a "Business Man's College Course" of three years, leading to the degree of Bachelor of Science; the requirements for admission are the same as those for the College of Liberal Arts. Twelve of the 16 members of the College Corporation are elected by the Michigan and Detroit Conferences of the Methodist Episcopal Church. College fraternities have been established as follows: Delta Tau Delta, Sigma Chi, Alpha Tau Omega, Sigma Nu, Delta Gamma, Kappa Alpha Theta, Alpha Chi Omega; the last three are women's societies. There are (1909) 27 members on the instructing staff, 10 of whom are full professors. The students number 452, divided as follows: College of Liberal Arts, 258; Conservatory of Music, 187; School of Painting, 13; School of Business, 70; Preparatory and "Unclassified," 79. The grounds, buildings, and equipment were valued (1906) at $250,000; the total annual income is about $42,000. The average salary of a professor is $1620. The Rev. Samuel Dickie is president. C. G.

ALBRIGHT COLLEGE, MYERSTOWN, PA. —Founded in 1902 by the union of Central Pennsylvania and Albright colleges. It is coeducational, and offers classical and scientific courses, and maintains normal and fine arts departments and preparatory school, giving a three years' course. Admission is by certificate of an approved school or by examination requirements equivalent to three and a half years' high school course. Degrees are conferred. There is a faculty of 11 professors and adjunct professors. Clellan Asbury Bowman, A.M., Ph.D., is president.

ALCHAYAMI. — See OMAR KHAYYAM.

ALCHEMY.— Ancient and medieval chemistry, from which our modern science did not wholly free itself until Lavoisier (*q.v.*) made his extraordinary discoveries in the latter part of the eighteenth century. The word is of doubtful origin. Kimia (χημία) may have to do with an "infusion," or perhaps with the Greek form of the native name of Egypt. The prefix "al" is a contribution made to the term by the Arabic writers, to whom the Middle Ages owed their knowledge of the subject. Chemical substances and processes naturally engaged the attention of the ancient Egyptians as they gradually learned to work gold and silver, make glass and enamels, to color them, and to dye fabrics. Their success roused indefinite hopes that they might be able to change the baser substances into gold and silver, produce precious stones, and mayhap discover some drug that would put to flight all forms of disease. Accordingly, when alchemy emerges in the writings of the third and fourth century of our era, by Zosimus, Synesius, Olympiodorus, and others, it is traced back to Hermes Trismegistus of mythical Egyptian origin, and contains, along with certain practical and impractical recipes for alloys, bronze, glass, enamels, etc., a vast accumulation of superstition, mysticism, and symbolism. This is due in part to the resemblance of the more startling chemical changes to those ascribed to magic; in part to the secrecy demanded by enterprises which if kept to himself might enrich the fortunate discoverer. The alchemist was from the first a highly suspicious character, open to accusations of imitating gold and silver, brewing poisons, and consorting with evil spirits. We have a report that Diocletian ordered the book of the Egyptians concerning the transmutation (περὶ χημίας) of gold and silver to be burned. Alchemy, like astrology, reached western Europe in the thirteenth century through the Arabic writers, and continued to flourish there, with all its disreputable accompaniments, for five hundred years.

With our modern notions of the various kinds of atoms and the observed laws according to which they combine with one another into more or less complicated molecules, it is very difficult indeed to sympathize with the speculations and theories of the Middle Ages. Indeed, one may suspect that a considerable part of the fantastic terminology of alchemy, some of which can be derived from Egypt, was very obscure even to the adept. It is clear that every one agreed that all things were composed of the four elements, earth, air, fire, and water. Lead was cold and dry; tin, hot and wet; the former had the "complexion" of Saturn, the second of Jupiter. Avicenna is said to have held that copper, which resembled Venus, was nearest silver, and was composed of quicksilver and sulphur, heated for centuries in the bowels of the earth. Roger Bacon (*q.v.*), who abhorred magic and expresses many reservations in dealing with astrology, gives us a good notion of what a thoughtful scholar in the latter part of the thirteenth century might deem the main purposes of alchemy. The great object was the discovery of the secret of making gold of lead and silver of copper. In this way not only would the state be greatly aided, by a sufficient supply of the precious metals, but, what was far more important, life would be greatly prolonged. "For that drug (*medicina*) which should remove all impurities and sources of corruption from the baser metals and produce the purest of gold and silver would, it is believed by the wisest of men, eliminate the sources of corruption in the human body to such a degree that life would be prolonged many centuries" (*Opus Majus*, Pt. VI). Adam's body was so perfectly tempered and balanced that the elements were held in equilibrium, and, had he not sinned, he would have enjoyed something like bodily immortality. Bacon suggests the principles upon which this elixir or philosopher's stone is to be compounded. He believes that human life could be greatly prolonged by a combination of gold, pearl, flower of sea dew, spermaceti, aloes, bone of stag's heart, flesh of Tyrian snake and of an Ethiopian dragon. These, the very highest authorities agree, would, if reduced to absolute simplicity, so that they would not infect one another, produce the sovereign remedy (*summa medicina*). The old alchemistic conceptions linger in our terms, spirits of wine, aqua regia, quicksilver, etc. The search for the philosopher's stone led to much experimentation, and the discovery of new substances and compounds and useful chemical processes. In the latter half of the seventeenth century many new preparations were discovered, the gases began to be distinguished, and the English chemist Boyle (*q.v.*) (1626–1691) exercised a decisive influence in eliminating from chemistry the ancient belief in occult properties.

J. H. R.

See article on CHEMISTRY.

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ALCIAT, ALCIATI, or ALCIATO (ANDREA). — (1492–1550.) Born at Alzato in the Duchy of Milan in 1492, and died at Pisa in 1550. He was the restorer of the Roman law, and the Renaissance leader who brought literature to the aid of law. "The historians of Rome, her antiquaries, her orators, and poets were called upon to elucidate the obsolete words and obscure allusions of the Pandects; to which, the earlier as well as the more valuable and extensive portion of the civil law, this method of classical interpretation is chiefly applicable." (Hallam, *Literature* *of Europe*, edition of 1855, Vol. I, p. 417.) He lectured on law at Avignon, Milan, Bourges, Paris, Pavia, Bologna, and Ferrara. Everywhere he urged the lawyers to write with purity and elegance, and bring law into literature. " Practical " lawyers were opposed to him, for he attempted to " sweep away the rubbish of the old conflicting glosses, and their subtilities." He was a man of the widest learning in the encyclopedia of knowledge of the times. Besides his distinguished position as the reformer of law studies, he was the pioneer in the writing of emblems. Henry Green, the great authority in emblem literature, in his edition (1870) for the Holbein Society of *Andreas Alciat's Emblematum Fontes Quatuor*, says: " If we would desire to know what amused, and, maybe, instructed the men who were leisurely literate in the middle of the sixteenth century, we must seek some acquaintance with works like Alciat's *Emblems*, where the graving-tool attempts to give a visible form to the wisdom concealed in mottoes and exemplified in stanzas, whether of Latin verse or of the vernacular rhymes." Emblem books, it must be also borne in mind, were used by schoolmasters to assist in stimulating verse-writing, for rhetoric, and also for conversation study of languages, where the letter-press in connection with the device was given in two or more languages. F. W.

See EMBLEMS.

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ALCOHOL, THE USE AND PSYCHOLOGICAL EFFECT OF. — This is a subject of very great scientific interest in recent years, and one in which much experimental work has been done without very wide conclusive result. The subject has much educational interest both because of the actual effect upon school children whether used directly or by their parents, and also because of the extensive legislation relative to temperance instruction (*q.v.*). Results can be stated in a tentative form only. The application of such generalizations as have been reached should not be hastily made.

On respiration alcohol has a slightly stimulating effect, increasing somewhat the absorption of oxygen. The aromatic flavors, however, of wines, brandies, and other liquors are found to exert a more powerful influence than the alcohol itself. The presence of pure alcohol affects salivary or pancreatic digestion but slightly, when in moderate dilutions. Gastric secretion is powerfully stimulated by moderate doses of alcohol in the stomach, and digestion is not noticeably retarded as long as the percentage of alcohol is below 5 per cent. The presence of 15 per cent of alcohol may retard digestive action one fourth, or even one third. Alcohol causes dilatation of the blood vessels, and consequent hyperemia, of the mucous lining along the digestive tract, especially of the stomach, attending more or less permanent paralysis of the vaso-motor nerves. A degeneration of the proper glandular tissues is also often attributed to continued use of alcohol, but these results are by no means constant. Among the digestive organs the most marked effect is produced in the liver, in which growth of connective tissue is stimulated, giving rise to cirrhosis, or a hardening, of the organ, which is accompanied with degeneration of the liver cells proper and consequent impairment of function. Fatty degeneration of the liver cells is often apparently caused by acute alcohol poisoning.

With regard to the food value of alcohol, the balance of evidence seems to indicate that alcohol is utilized by the body like starches, sugars, and oils, only, however, if taken in small amounts. It is, in fact, actually produced in minute quantities in the various tissues as one of the products of metabolism. It is clearly not a tissue-building food, and the train of effects set up by it is so complicated that the evidence is still inconclusive whether it can be considered even a tissue-protecting or tissue-saving food. In all cases of prolonged and severe tests of strength and endurance, — mountain-climbing, fatiguing expeditions in cold climates, athletic sports, — alcohol is strictly excluded from the diet.

The continued use of alcohol is recognized as an important cause in cases of shriveled, granular kidney and chronic Bright's disease; and also of dilatation, hypertrophy, and fatty infiltration of the heart, and in cirrhosis of the blood vessels.

As exhibited in the ordinary phenomena of acute intoxication, more or less marked according to individual susceptibility and the amount taken, the special toxic effect of alcohol is on the nerve centers. Here the loss of control, inhibition, and even of the power of coördination is clearly due to a throwing out of function of the higher brain centers. From being at first functional and passing off with the intoxication, recent evidence is accumulating to prove that degeneration of the nerve cells may be caused by continued use of alcohol. This degeneration may occur anywhere in the nervous system — in the brain, spinal cord, or sympathetic ganglia; and if cells are destroyed, new cells do not develop, and thus the injury is permanent. As a result various forms of insanity are thus directly caused by alcohol; and these cases amount to from 25 per cent to over 30 per cent of all admissions to insane asylums. Perhaps the most serious general effect of alcohol is the impaired organization of the nervous system in the offspring of alcoholic parentage. Twenty per cent of all epileptics are traced to this cause.

Demme studied the histories of ten alcoholic and ten normal families, with the following results —

	Ten Alcoholic Families	Ten Normal Families
No. of children .	57	61
Deformed . . .	10	2
Idiotic	6	0 (2 backward)
Epileptic, choreic	6 (one epileptic cured ?)	0
Non-viable . .	25	3
Normal . . .	10 (9 ?) (17 per cent)	54 (88.5 per cent)

An experiment with two pairs of dogs, carefully balanced, the males brothers and the females sisters from two not closely related litters, yielded a closely comparable result. Chemically pure alcohol, in amount not sufficient to cause perceptible intoxication, was given with the animals' meals.

Alcoholic Pair

No. of whelps .	(7–7–6–3)	23 (17.4 per cent)
Deformed . .	(2–3–3–0)	8
Born dead . .	(2–2–2–3)	9
Viable	(4–0–0–0)	4 (17.4 per cent)

Normal Pair

No. of whelps .	(5–3–8–8–5–6–3–7)	45
Deformed . .	(1–0–0–2–0–0–0–1)	4
Born dead . .	(0–0–0–0–0–0–0–0)	0
Viable	(4–3–8–5–5–6–3–6)	41 (90.2 per cent)

Davenport says: "Nor do I propose to consider in any detail the effects of drugs on germ plasm. The matter awaits further investigation. Meanwhile experience indicates that the marriage of alcoholists certainly, and probably of users of any drug to extremes, is associated with defective development of offspring, and is, in so far, unfit." (*Eugenics*, New York, 1910, p. 5.)

Public instruction in the physiology and hygiene of alcohol was made the subject of exhaustive investigation by the Committee of Fifty, results of which are published in Vol. 1 of the *Report* cited below.

Many careful scientific experiments in regard to the effects of the use of alcohol on muscular work and mental activity have been made in recent years. In considering the results of these investigations the first thing should be a word of warning against hasty and sweeping inferences. The effects of alcohol are largely relative to the amount of the dose, the kind of work done, the length of the work, the particular mental processes studied, etc.

The tests of the effects of alcohol on muscular work have been made for the most part with the ergograph (*q.v.*), an instrument which records the amount of work done by the contraction of one finger or one arm in lifting a weight. These tests have usually shown that the amount of work performed by a muscle is increased by the use of alcohol, either under certain conditions, or in certain persons, or for a certain time. Usually the number rather than the height of the contraction is affected. Sometimes, the effect of alcohol is first to increase the muscular ability and then to decrease it.

The method itself is not free from objections, especially because certain psychic factors such as suggestion and the like are not excluded. Dr. Rivers, an English investigator who has made very careful studies, attempted to rule out these mental factors by disguising the alcohol given to his subjects, mixing it with other drugs. For example, it was administered with a solution of peppermint, so that the subject was unable to tell whether the mixture contained alcohol or not. On certain days 10 to 15 cc. of this mixture were given immediately before the test, and on other days the same mixture without alcohol was given. Ruling out the factors of interest and suggestion in this manner, only negative results were obtained. The work done by the subjects was neither increased nor diminished. Thus the problem of the effect of alcohol even upon the muscular ability is a complex one, and yet the main result seems to be well established, that, except when given in small doses, the effect of alcohol is to increase the ability to do muscular work at first and then to decrease it.

Tests of work involving mental processes and of memory and association directly have been made by a number of investigators, the most important of these by Kraepelin and his pupils and by Specht. Tests of writing have shown a decrease in the amount of work done. Careful tests of men engaged in typesetting have shown a considerable decrease under the influence of moderate doses of alcohol; and, while the number of persons tested thus far is relatively small, the inference seems to be entirely justified that the general effect of alcohol is to decrease one's working capacity in such occupations, although the subject often has the feeling that he is doing more than usual.

Tests have also been made of the effect of moderate doses of alcohol upon such intellectual processes as committing to memory, free and habitual association, discrimination, and the like. The results differ with the different mental processes tested, but generally the effect of alcohol is to decrease the mental ability. The simple reaction time is shortened somewhat at first. Choice reaction times are lengthened. Speech associations are often increased, but in general the power of both free and habitual associations is decreased. The ability to add is decreased; the power of committing to memory is decreased. Attention as tested by the ability to strike a dot on a revolving drum is decreased.

All of these processes tested are considerably complex. Specht has tried to test the effect of alcohol upon the simplest mental processes, choosing the sensations of sound and testing the initial threshold, that is, the least sound that can be heard, and the discrimination threshold, that is, the smallest difference between two sounds that can be noticed. The striking result was found that the effect of alcohol on these two thresholds is different. The initial threshold is diminished; the discrimination threshold is increased; that is, under the influence of alcohol, a lower sound can be heard, but the difference between two sounds must be greater in order that they may be distinguished. The explanation given these opposite results is open to doubt. The effect of alcohol is to narrow the span of consciousness and apparently to decrease the memory. As a result of this only the single sound is attended to, and other stimuli are not noticed. The one sensation attended to fills the whole of consciousness. Consequently a lower sound than usual can be distinguished; but in case of two sounds the first fades out or is banished from consciousness as soon as the second is noticed, and consequently the two cannot be held together and compared as in the normal condition. Specht finds that the effects of small doses of alcohol are the same in kind as the effects of large doses, and that the results of taking alcohol are cumulative.

The chief results of all these investigations of the effect of alcohol on mental ability are apparently the following: the sensory-motor activity is increased; the ability to commit to memory and the power of association and the more complex mental processes in general are decreased. The effect of small doses on muscular ability does not seem to be appreciable when the psychic factors of suggestion and the like are ruled out. The effect of larger doses is to increase the muscular ability at first and then decrease it. In general the immediate effects of moderate doses of alcohol of from 30 to 40 cc. is to increase muscular ability and to decrease the mental ability. The immediate effect of large doses is to decrease the mental ability, and the effect of such doses persists for a long time, perhaps for 48 hours. The depressing effects of alcohol in general have been clearly shown.

No adequate investigations of the effect of alcohol upon the mental ability of children have been made ; but the studies by Kende on 25 children indicate that the effect is similar to that in case of adults. And there seems to be the more reason for forbidding altogether the use of alcoholic stimulants to children and youth ; for during the period of development at all events the mental activity should be spontaneous, without interference from drugs of any kind, and the effect, even of moderate doses of alcohol, is probably to retard mental development.

In view of the inadequate investigations already made, the special psychic effects of alcohol can hardly be stated dogmatically.

C. F. H. AND W. H. B.

See TEMPERANCE, INSTRUCTION IN, for a discussion of the more directly educational aspect of this topic, and for the legislation relating thereto.

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ALCORN AGRICULTURAL AND MECHANICAL COLLEGE, ALCORN, MISS. — A coeducational institution for white students, founded by the Southern Presbyterians in 1828 as Oakland College, and taken over in 1871 by the state. The present title was adopted in 1878 to obtain the benefits of the act of Congress of 1862. A state appropriation of about $15,000 a year is received. A five years' preparatory course, leading up to the four years' college scientific course, is offered, upon the completion of which the degree of B.S. is given. Admission requirements are, however, vague and indefinite. Departments of agriculture, industries, fine arts, and nurse training are also maintained. The faculty includes 5 professors, 3 assistant professors, and 12 instructors and assistants. L. J. Brown, B.S., is the president.

ALCOTT, AMOS BRONSON (1799–1888). — Educator and author, was born at Wolcott, Conn., Nov. 29, 1799. He was essentially self-educated, having received an abbreviated course in the common schools and academies of New England. In 1813 he took up the itinerant occupation of peddler of small wares and subscription books, which took him into most of the states of the Union. He began his career as a teacher in Connecticut in 1823, and his school at Cheshire soon attracted widespread notice by the examples of improvement which he set. Single desks were substituted for the long benches and double and three-seated desks; the pupils were provided with slates, pencils, and blackboards ; a school library was established ; light gymnastic exercises were introduced ; the children were encouraged to keep diaries and to make collections of common objects, and he broke away from the old rule of severe and indiscriminate punishments, and substituted therefor appeals to the affections and moral sentiments of the children. Of his course of study he wrote, "It is adapted professedly to the wants and genius of the young mind; it refers to children, and it insists that children are the best judges of what meets their wants and feelings." His scheme of moral training was the most rational and elaborate in the annals of early American education. Equally important was the scheme of physical training. It aimed to train the physical powers in relation to the practical uses of life. It provided special exercises for the eye, the ear, and the voice, with emphasis on such games as balancing, jumping, hopping, swinging, and running. His principles of intellectual education may be briefly summarized as follows: follow nature; employ the known to induce the unknown; teach by visible and tangible objects, by oral, illustrative, and familiar methods; bring all of the powers of the mind into harmonious development and exercise; prepare the mind to investigate for itself; make experiment the test of theory and the basis of fact; consult the minds, genius, and habits of the pupils; furnish constant employment. The school was open in the evenings for story-telling, plays, and games. Self-government was a notable feature of the Cheshire experiment. A superintendent, a recorder, a librarian, and a conservator — selected from the school members — coöperated with the teacher. Reforms so pronounced were not to pass unchallenged, and Mr. Alcott soon met with endless opposition, not only from his patrons but from his colleagues. In 1828 he went to Boston, where he opened an infant school and published his *Observations on the Principles and Methods of Infant Instruction*, which in some respects was an exposition of the Pestalozzian method. He was called to Philadelphia in 1830 to accept a position in a private school conducted by William Russell, but four years later he returned to Boston and opened the famous Temple School. Here he repeated the experiments of the Cheshire school, and introduced innovations which shocked the pedagogic repose of his conservative contemporaries. He had as assistant teachers in the Temple School two women who later became distinguished in American education and letters: Elizabeth Palmer Peabody (*q.v.*) and Sarah Margaret Fuller, afterwards the Marchioness d'Ossoli. Miss Peabody's book, *Record of Mr. Alcott's exemplifying the Principles of Moral Culture* (Boston, 1835), gives an admirable pen picture of the Temple School; and Mr. Alcott's daughter Louisa May in her *Little Men* utilized many of the incidents of the experiment in her imaginary Plumfield School. In 1836 Mr. Alcott published the first volume of his *Conversations with Children on the Gospels*, and a year later the second volume appeared. These books met with a storm of criticism from the ultra-orthodox which ultimately caused the downfall of his school. The Boston experiment met the hearty approval of such well-known educational leaders as Horace Mann, Henry Barnard, Thomas H. Gallaudet, Ralph Waldo Emerson, Walter R. Johnson, and William Ellery Channing; but the opposition from conservative and traditional schoolmen ruined the financial support of the school, and it had to be given up in 1839. Harriet Martineau, after her return to England from America in 1837, published what she intended to be a caricature of the Temple School. It came to the attention of James Pierrepont Greaves, an English philanthropist and former associate of Pestalozzi. He saw in her burlesque the genuine Pestalozzian spirit and method, and at once opened correspondence with Mr. Alcott and pronounced him the true successor of the Swiss reformer. An English Pestalozzian school which Greaves was organizing at Ham was named the Alcott House, in honor of the American teacher. Alcott subsequently made a trip to England, but Greaves had died before he reached there. The last fifty years of his life Alcott devoted to the study and teaching of philosophy. His contributions to the literature of education will be found in the *American Journal of Education* (1826–1831), the *American Annals of Education* (1831–1837), and the early volumes of the American Institute of Instruction. During his closing years he took an active part in the conduct of the Concord School of Philosophy. He died at Concord, Mass., March 4, 1888. W. S. M.

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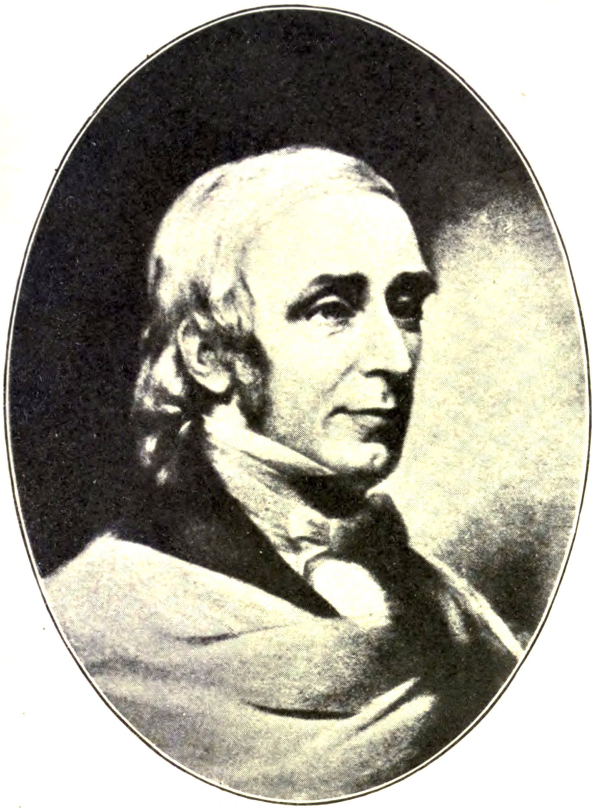
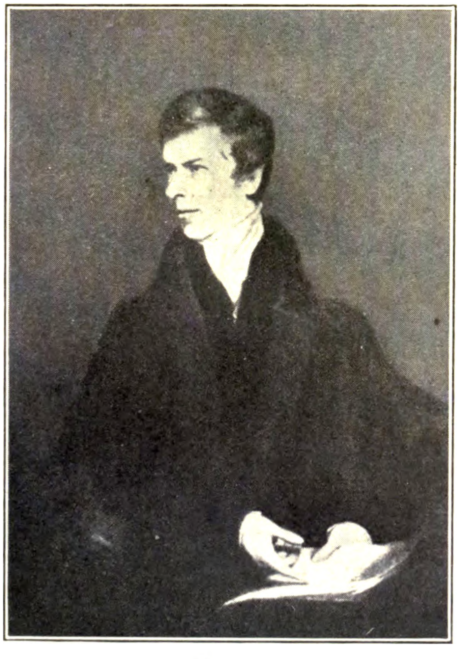
ALCOTT, WILLIAM ALEXANDER (1798–1859). — Educational writer, educated in the public schools of Connecticut and at Yale College; teacher in the public schools of Connecticut; institute lecturer in New England; associate editor of the *American Annals of Education;* author of *Construction of School Houses, A Word to Teachers, Essays on Penmanship*, and *Confessions of a Schoolmaster;* also of numerous articles in educational journals. W. S. M.

ALCUIN (**ALCHUINE**: Lat. **ALCUINUS** or **ALBINUS**; called **FLACCUS** at the Palace School) (735–804), the adviser of Charlemagne, was born of noble Northumbrian parentage about 735 A.D. Educated at the School of York, under the supervision of Archbishop Egbert (*q.v.*), he was first the favorite pupil and then the beloved colleague and traveling companion of the master, Ælbert; and finally, when in 766 Ælbert became archbishop, his successor, jointly with Eanbald in the conduct of the school. He was ordained deacon probably



A. Bronson Alcott.

William A. Alcott.



Lord Brougham.

Dr. Andrew Bell.

EARLY NINETEENTH CENTURY EDUCATORS.

in 767 (he never received priest's orders), and continued to teach and travel till in 778 Ælbert's resignation and Eanbald's consecration as archbishop left him undisputed head of the school, while on Ælbert's death in 780 he apparently inherited his master's library. Already his journeys and the influx of foreign students to York had introduced him to many continental scholars, — and now, going to Rome to procure the *pallium* for Eanbald, he met Charles the Great at Pavia, in March, 781, and was induced to transfer his services, first tentatively and then permanently, from the Northumbrian to the Frankish kingdom. Till 793, however, his work for Charles was only intermittent. He appeared in Mercia in 786, as a Northumbrian commissioner in attendance on the Papal Legates, and again in 790 as an envoy sent by Charles to make peace with Offa; and then Northumbrian affairs occupied him till 793. But in 794 he was present at the Synod of Frankfort, and, various causes having prevented his obeying Eanbald's summons to York in 795, the murder of the Northumbrian king in 796 finally determined him never to return to England. Hoping for retirement at Fulda, he was allowed only to exchange his work at the palace for the task of establishing a model monastic school as Abbot of St. Martin's at Tours. Here he spent his last years in study, teaching, and devotions, paying at first an annual visit to the Court, and carrying on in letters, treatises, and even in a public disputation at Aachen (probably in 799), a lengthy controversy with the Adoptionist heretics whose teachings had lately spread from Spain into Southern Gaul. But in 801 increasing ill health obliged him to delegate all secular tasks to others, though he still wrote and studied. He died on Whitsunday, May 19, 804.

Lacking as Alcuin was in heroic qualities, — in daring and in originality, — there was much that was attractive in his character. Pure and devout, patient, kindly, and humble-minded, he was generous in the love and admiration he lavished on men of a stronger type. Above all things he was faithful — faithful to his master Charles, to the See of Rome, to the orthodoxy of his teachers, to the moral standard by which he guided himself and judged others, and to the compelling sense of duty which made him forget pain and weakness in his eagerness to be ever gaining and giving the treasures of wisdom and combating error with the weapons of authority and precedent. In some degree this humble fidelity stands in the way of a just estimate of his work. He was so much the instrument of others, the executor of their wishes, the medium for transmitting their teaching, that the personal element is hard to evaluate. His voluminous writings are not in general educational, but consist mainly of letters and poems, controversial, theological, and liturgical compilations. There are, however, treatises on grammar, rhetoric, and dialectic, with two short dissertations and various letters on astronomical problems, mainly in connection with the calendar. Works on music, arithmetic, and geometry, mentioned by Alcuin's biographer, are not known to exist. The *Grammatica* begins with a short dialogue *De vera philosophia* between a master and a pupil, which indicates Alcuin's views on education. Like most medieval writers, he makes the comprehension of the Scriptures the ultimate aim of study; but, insisting on the need of enlightenment from on high, he urges also the necessity of human effort, and declares the Seven Liberal Arts essential to the attainment of wisdom. In the second dialogue, in which the *personæ* are Alcuin and two boys, a Frank and a Saxon, he defines Grammar, meagerly enough, as the "science of written sounds, the guardian of correct speech and writings," and, though enumerating twenty-six parts of the subject, actually confines himself almost entirely to accidence and etymology: a supplementary *De Orthographia*, however, correcting the *Turonica rusticitas* of his pupils at St. Martin's. The *De Rhetorica et Virtutibus* discusses the uses rather than the nature of Rhetoric. The dialogue form, characteristically Anglo-Saxon, is retained, but the speakers are here Alcuin and Charles himself. The treatment of the subject, based on Cicero and Isidore, is meager. The *De Dialectica* deals with the dialectic art itself, not merely its applications, but is neither original nor adequate, though dialectic is declared necessary to the study of theology.

These treatises would by themselves hardly entitle Alcuin to a high place in the roll of medieval scholars, but they afford no safe criterion of either his own attainments or his educational success. Granted that his knowledge of rhetoric and dialectic was superficial, that he was ignorant of Hebrew and scarcely less so of Greek, yet at least his grammatical studies were wide enough to give him a familiar acquaintance not only with patristic writings, but with some Latin classics, especially with the poets whom to the last he loved to quote, and a capacity for writing, not only facile though faulty and uninspired verses, but Latin prose, which, if not invariably correct, was easy, simple, and dignified. And, again, it was not as the writer of textbooks, — imperfect summaries of oral teaching,— but as a Minister of Education to Charles, and as the master whose personal teaching stimulated the interest and industry of pupils, men and women, of every rank and age, that he did his real work for learning. It is indeed impossible to appraise exactly his share in the Carolingian Renaissance. He was undoubtedly the confidential adviser of Charles in his educational schemes; they seem sometimes to follow Anglo-Saxon precedents, — and the *Admonitio Generalis* and the letter to Abbot Baugulf in particular, breathing

Alcuin's very spirit, may even have been drafted by his pen. But more than this cannot be said. And, while his letters show us the born teacher, — patient, considerate, indefatigable; devoted to his task; confident of the sacredness of his vocation, — they give little or no detailed information as to the methods and results of all his labors. Thus the value of his work is left to be surmised from the vigor which after his death still marked the schools where he had taught, — from the achievements of his own pupils, or his fellow laborers, — and from the persistence of the conservative, as opposed to the creative, impulse of the intellectual revival, all through the dark period of feudal strife and anarchy, till the dawn of a greater revival in the twelfth century.

See also the article on Charlemagne and Education. C. J. B. G.

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ALDEN, JOSEPH. — Educator and author, born at Cairo, N.Y., Jan. 4, 1807; educated in public and private schools, at Brown University, and Princeton Theological Seminary; professor in Williams College (1835–1852) and in Lafayette College (1852–1857); president of Jefferson College (1857–1867) and principal of the State Normal School at Albany (1867–1872); author of *Ethics, Logic, Political Economy, Civics,* and *Intellectual Philosophy;* died at New York City, Aug. 30, 1885. W. S. M.

ALDEN, TIMOTHY (1781–1839). — Educated in the district schools of Massachusetts and at Harvard College; teacher in public schools and academies; first president of Allegheny College (1817–1831). W. S. M.

ALDHELM (640 (?) - 709). — An English scholar important in the history of education as one of the most brilliant of the scholars trained at the Canterbury school founded about 668 by the Archbishop Theodore and the Abbot Adrian (*q.v.*). The school gave a new impulse to learning, though it would be an error to suppose that learning had fallen asleep altogether between the Roman military evacuation and the coming of Augustine in 597. The school or schools founded in East Anglia by the joint efforts of King Sigberct, the Burgundian Bishop Felix, and the Irish monk Fursa in 630 depended for teachers on "pedagogues and masters after the custom of Kent" (Bede, *Hist. Eccles.*, c. xviii), which shows that the Roman imperial schools in Kent survived the Saxon onslaught. Aldhelm himself represented the older culture, for, born at Sherborne, he had as his teacher the famous Irish teacher Maildulf of Malmesbury, who himself represented, as Fursa represented, the imperial tradition. On the arrival of Theodore and Adrian, Aldhelm at once joined them, and from them and their varied library acquired a profound knowledge of Greek and Latin, as well as, there is reason to believe, Hebrew. We know from famous Anglo-Saxon and medieval documents that the study of Hebrew never entirely died out. The calls of learning were so insistent that Aldhelm joined the Canterbury school a second time in further search for knowledge. He was a worthy scholar of a school that rendered possible the great literary movement which was to be crowned by Alcuin. Bede tells us that as late as 732 there were scholars to whom Greek and Latin were as familiar as their native tongue. Aldhelm, the chief scholar of his age, did much to strengthen the movement. As the successor of Maildulf in the monastery at Malmesbury, and as the first Bishop of Sherborne, he did much to multiply houses of learning and to spread culture. By his journey to Rome in the days of Pope Sergius, he may be said to have paved the way for the formation of the Saxon School of Rome by his kinsman Ine, king of the West Saxons, in 727 (*Flores Historiarum,* Rolls ed. Vol. I, pp. 368–369; and see Matthew Paris). Ine himself was indeed an educationalist worthy of his age for "he hired the services of two most skilful teachers of Greek from Athens." (Sandys.) But Aldhelm was not merely a scholar and the first of the line of scholars who adorned the eighth century in England. He was also a famous builder of churches, and at least one of his buildings still survives. We may see in this church-building movement the origin of that technical training in church schools which was enjoined by the English Canons of the year 960. Aldhelm died in the year 709, in the wooden church of Doulting near Wells, and he was buried at Malmesbury, itself one of the most famous of the early centers of education. Some of Aldhelm's literary work is still extant, such as his *De Laude Virginitatis* (which was dedicated to and is evidence of the Latin culture of the Abbess of Barking and her nuns), *De Laudibus Virginum* and an educational work on the writing of Latin verse entitled *Liber de Septenario* (see the *Dictionary of National Biography*). J. E. G. de M.

ALEXANDER, ARCHIBALD (1772–1851). — Historian and theologian educated at Washington and Lee University; president of Hampden Sidney College (1797–1806) and of Union College in Georgia (1810–1812; professor in Princeton Theological Seminary (1812–1851); author of *History of the Log College*, *Outlines of Moral Science*, and of numerous theological and historical works. W. S. M.

ALEXANDER DE VILLA DEI (or **VILLEDIEU**). — A native of Flanders who flourished during the latter twelfth and early thirteenth centuries. About 1119 he wrote a Latin grammar, a part of which is the *Doctrinale*, one of the most famous and most widely used of all textbooks. It is composed in verse, and consists of 2645 lines, 1073 of which are devoted to etymology, 476 to syntax, and 1095 to quantity, accent, and figures. Numerous manuscript copies yet exist, and it went through almost 300 printed editions. As an introductory text it went far to replace the older ones, such as Donatus and Priscian. Its popularity was due partially to its metrical form which rendered it easier to memorize. The prevailing method of elementary instruction was by memorizing of the complete text. Its logical arrangement and distinctions appealed to the dialectic interests of the times; and in addition it included more of a vocabulary drawn from Christian authors, and incorporated many of the changes in the language which had occurred subsequent to the construction of the earlier texts. The general use of the text obtained for its author the title of the "Aristotle of Grammar"; but for the same reason the text drew the special opposition of the early humanists, and it was generally discarded early in the sixteenth century.

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ALEXANDER I, OF RUSSIA. — See Russia, Educational Systems of.

ALEXANDER, THE GREAT. —Born 356 B.C., died 323 B.C. He is interesting to us in this place not as conqueror and soldier, but in his capacity as pupil of Aristotle and patron of Greek letters. He was first committed to the care of Lanice, his nurse, who loved him as a mother and whose children afterwards served him to the death. At the age of 6, he fell under the care not of an ordinary Greek pedagogue, the typical chaperoning slave, but of a man of royal birth, Leonidas, a strict disciplinarian who taught the lad temperance and economy, and perhaps gave him an example of the martinet which Alexander was not slow to imitate in later life. At length his father, the royal Philip of Macedon, recognizing that it was better to influence the youth by argument than command, sent for Aristotle, as the most learned and sagacious of philosophers, to come to him. Alexander was at this time 12 years of age. The two formed an extraordinary conjunction, for, as Zell says: "The one had the power and the call to master and rule the world. The other had discovered and subjugated a new world for the human mind and for science." Alexander became a pupil in Aristotle's school at Mieza, where the great master was wont to walk through the grove with his pupils or teach them from his great stone chair. Although Aristotle declined the solicitations of Alexander, who ascended the Macedonian throne in 336 B.C., to accompany him on his warlike expeditions, a close correspondence and friendship appears to have been long maintained between these two, in some respects the greatest figures of the Hellenic age; and it is significant that on the death of Alexander, the Stagirite philosopher was compelled to quit Athens on the ground that he had been a Macedonian favorite.

It must have been partly owing to the influence of Aristotle that Alexander became an extensive reader of books and a most enthusiastic admirer of Homer, whose poetry alone he is said to have found truly noble, grand, and kingly. The principal authorities for Alexander's education are the somewhat doubtful accounts of Plutarch and Dion Chrysostomus. P. R. C.

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ALEXANDRIA, SCHOOL AND UNIVERSITY OF. — An institution which represents the zenith of the somewhat barren and pedantic period of cosmopolitan Greek learning. The city of Alexandria, founded in 332 B.C. by Alexander the Great, fell upon his death to Ptolemy Soter, who reigned in Egypt from 306 to 285 B.C. As wise a ruler as he was a successful warrior, Ptolemy appears to have reflected that the supremacy of the Greeks was ultimately the supremacy of mind, and under the advice and with the assistance of his friend, the Athenian orator, Demetrius Phalereus, he collected a vast number of manuscripts and built a museum. The museum is to be regarded as an endowed college designed at first as a home of erudition and research rather than a school for the propagation of knowledge. Its professors or fellows constituted a body of learned Greeks favored and supported by a Greek dynasty, but isolated in the midst of a nation of unsympathetic

Egyptians. They were therefore thrown back upon their own society and upon the standard literature of the classical age of Greece. Under these circumstances the Alexandrian university became more famous for literary and grammatical studies than productive genius; and the library, the greatest of ancient times, eclipsed the importance of the museum. On the other hand, a considerable absolute progress was made at Alexandria in mathematics and physical science as well as criticism, antiquarian research, and formal literature.

In an estimation of the work of the school and university of Alexandria, two periods ought to be carefully discriminated. From its foundation to its conquest by Augustus and the Romans in 30 B.C., the reputation of the institution was due to its literary and scientific bias. Subsequent to the Roman conquest, however, and until the occupation of Alexandria by the Mohammedans in 640 A.D., the remarkable feature of Alexandrian culture was the development of the Neo-Platonic philosophy. Accordingly the description which immediately follows applies primarily to the pre-Roman period of Alexandria.

The successor of the first Ptolemy continued and excelled the endeavors of the founder of his dynasty to make Alexandria the intellectual capital of the world. Ptolemy Philadelphus, during his reign from 285 to 247 B.C., was advised by the poet Callimachus in much the same way as his predecessor by Demetrius, and collected the works of Aristotle and many Egyptian and Hebrew texts. During this reign the greater and the lesser libraries were completed and a beginning was made in the direction of translating the Hebrew Scriptures into Greek. This was the origin of the famous Septuagint version of the Old Testament. Of the third Ptolemy, called Euergetes, it is related that he borrowed from Athens and retained the standard editions of the great Athenian dramatists, while he also required travelers to leave behind them a copy of any literary work which they might be so fortunate as to possess. The traditional accounts of the number of books collected in the great library are incredible; the volumes are said to have amounted to 200,000 in the time of Demetrius Phalereus, and to have numbered at the maximum 700,000.

Inconsiderable as the quantity of extant literature produced by the Alexandrian school must be, in comparison with the enormous amount that has been lost, it is none the less sufficient to indicate the general characteristics of early Alexandrian culture. Much of it was pedantic; there was little or no expression of romanticism outside the poems of Theocritus. There were learned poems like the *Hymns* of Callimachus, obscure epics such as the *Argonautics* of Apollonius Rhodius and the *Alexandra* or *Cassandra* of Lycophron, didactic verses typified by the *Phænomena* and *Signs of Weather* of Aratus, epigrams and satires like those of Timon. The atmosphere of courts and royal endowments conduced to research rather than creative activity, formalism rather than freedom. Grammar, criticism, prosody, and mythology were first elevated into sciences at Alexandria. Here, first, lives were devoted to archæology; here, the first dictionaries were made. But there was no attempt to nationalize the foreign culture, no attempt to fuse the Greek and Egyptian civilizations.

If the progress of Alexandrian culture appears to have been slow, relatively to its opportunities, it is none the less vitally important from an absolute point of view. The labors of Euclid on geometry, Apollonius on conic sections, Archimedes on physics, Eratosthenes on scientific geography, Hero and Philo on dynamics, and Hipparchus on astronomy cannot be too fully appreciated. It was to Alexandria, and especially to Hipparchus, that the remarkable Ptolemaic system of astronomy, with its epicyclical theory of the movements of the heavenly bodies, admirable and serviceable notwithstanding its errors, was due. But such genuine scientific achievements were buried among a mass of prose commentaries and expositions.

One serviceable result of the zeal for exposition and criticism remains to be mentioned. It was the work of the early Alexandrian savants not only to collect and preserve classical manuscripts, but also to arrange the texts and settle the accents. It is owing to their patient efforts that we now possess the theory of Greek accents and legible texts of the Homeric and other great works of the Greek intellect.

Subsequent to the Roman occupation of Alexandria in 30 B.C., while the sway of Greek letters in the schools suffers no interruption, it perceptibly yields to the dominant interest in philosophy. Alexandria was peculiarly fitted by its situation and the quality of its population, in which Greek, Hebrew, Arabic, and Egyptian elements were prominent, to become the seat of a new synthetic philosophy. The peculiarity of Alexandrian philosophy consists in its symbolical and religious bent. In a large measure, these features were the result of an attempt to harmonize the highest results of the religious speculation of Plato and Aristotle with the religion of the Jews and afterwards with Christianity. The contact of Greek with Hebrew thought produced Neo-Platonism (*q.v.*), which is represented by the names of Ammonius Saccas, Plotinus, Porphyry, Iamblicus, and Proclus. The contact of free Greek thought with Christian doctrine issued in such heretical forms of belief as Gnosticism (*q.v.*). The Neo-Platonic philosophy in particular, whose best representative is Plotinus, has exercised a profound influence upon the thought of both the ancient and the modern world.

Because of its historical importance, and because it has been unjustly viewed by the orthodox on account of its liberalism, and by the scientifically minded on account of its symbolical vagaries, the Neo-Platonic philosophy of the Alexandrian school deserves a brief explanation. Its dominant characteristic is mysticism. It confounded philosophy with religion, and practically founded a church in establishing a school. It took up the cudgels against Christianity at the same time that it colored the pages of many of the Greek Fathers. Its heresy was regarded as dangerous because of its very insidious similarity to the Christian doctrine, which made its refutation so much the more difficult. On the other hand, Neo-Platonism, like other forms of mysticism, appealed chiefly to individuals and did not attempt to concentrate itself into a formal system. The method adopted in teaching the system was dialectic. A beginning was made from the dissatisfaction with the objects of sense which Plato had felt long before, and the separation of the world of sense from the superior, indeterminate world of perfect ideas which may be contemplated by reason. In reason, the ideas of the good may be studied by a return upon itself. The Neo-Platonic system of education totally disregarded the world of sense as unreal and remote, and fixed the gaze solely on the so-called "intelligible" world, at most adding only mathematics to its contemplation.

Ultimately as the seat of a metaphysical school of Christian theology, as well as of the Neo-Grecian sects, Alexandria became the theater of innumerable and bitter religious polemics between them, especially Neo-Platonism and Christianity. P. R. C.

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ALFRED, KING. — (Reigned 871-901 a.d.) **As Educator.** — The traditional ideals of King Alfred are set forth in his preface to the translation of Pope Gregory's *Pastoral Care* (ed. by Sweet, E.E.T.S.) and in comments in the translation of Boethius' *Consolation of Philosophy* (ed. by Sedgefield, p. 40). These passages find a close parallel in the *Epistola de litteris colendis* and other proclamations of Charles the Great (*q.v.*). The chief motive of reform was the lack of educated clergy who could understand the ritual of the Church or translate a Latin letter. In the past, since the work of the Celtic missionaries, the monasteries and bishops' sees had been the main, if not the only, centers of religious and classical learning. Although the service of the Church had been the first end in view, the secular teaching involved had led, especially in England, to a generous study of all available knowledge (see Roger, *L'Enseignement des lettres classiques d'Ausone à Alcuin,* Paris, 1905, which contains several chapters upon the spread of learning in Ireland and England). Except in Mercia, where Offa had to some extent maintained the study of letters, an educated clergy had disappeared in England when King Alfred came to the throne. Alfred's travels and wide interests had prepared him to remedy this defect, and to restore a learned clergy and educational centers. One of the scholars whom he introduced, Asser (*q.v.*) of St. David's, in his life of the king (ed. by Stevenson, Oxford, 1904, an edition indispensable for the student of Alfred's reign) describes the means taken by the king for carrying out his purpose. Learned men were brought from parts outside Wessex, Plegmund from Mercia, Grimbald from Flanders, John the old Saxon, who became respectively Archbishop of Canterbury, and abbots of Alfred's new foundations at Winchester and Athelney. Neither Grimbald nor John would have much difficulty with the English tongue (see Stevenson, p. 311). Alfred was eager for the education of the laity as well as of the clergy. Laymen had shared in the advantages of episcopal schools in the seventh century, *e.g.* they are found among the scholars of John of Beverley (Roger, *op. cit.,* p. 314). Alfred wished "that all the freeborn youth of England who have sufficient means to devote themselves thereto, be set to learning so long as they are not strong enough for any other occupation, until such time as they can well read English writing. Let those be taught Latin whom it is proposed to educate further, and promote to higher office" (Preface to *Pastoral Care;* Plummer, *Life and Times of Alfred,* p. 136). It is doubtful to what extent the scholars, new monasteries, and translations for which Alfred was responsible, produced this result. That some result was reached is clear from the story that ignorant royal officials, afraid of the king's displeasure, sought to learn from their children. The king devoted one eighth of his income to a *schola utriusque linguae,* which developed at his court (Asser, cc. 75, 76, 102). In this school the sons of the noble class and officers of lower rank were educated. It was not a school in the ordinary sense of the term, but a more systematic example, on the lines of the school at the court of Charles the Great, of a common institution (Stevenson, p. 300; cf. Guilhiermoz, *Essai sur l'origine de la noblesse,* Paris, 1902, *passim*).

The tradition which connects Alfred with Oxford, which was inserted by Camden in his edition of Asser, has long been known to have no foundation (Stevenson's Asser, pp. xxxiii seqq.; Parker, *Early History of Oxford*, ch. v; Rashdall, *Universities of Europe in the Middle Ages*, II, ii, 322–323). F. M. P.

See Middle Ages, Education in.

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ALFRED UNIVERSITY, ALFRED, NEW YORK. — A coeducational, nonsectarian institution, takes its origin from a small school organized Dec. 5, 1836, in the village of Alfred. In 1843, a charter was granted to "Alfred Academy and Teacher's Seminary"; in 1846 three school buildings were erected on the present campus; in 1857 a university charter was secured. The university maintains an undergraduate college, admission to which is by examination or certificate from an approved high school, and a preparatory school known as Alfred Academy. By chap. 383, *Laws of the State of New York*, there was established a New York State School of Clay Working and Ceramics, with buildings adjacent to the university campus; this school is administered by the trustees of Alfred University. It offers a course of four years leading to the degrees of Bachelor of Philosophy in Ceramics, and of Bachelor of Science in Ceramics, and also a short course of two years. The requirements for admission to the full course are the same as those for entrance to the scientific course of Alfred University. On May 6, 1908, the state of New York also established a state School of Agriculture at Alfred University; this school is governed by a Board of Managers appointed by the Alfred University trustees. Its grounds adjoin the university campus. The course comprises three years; it is planned (1909) to offer also a short term of summer work in agriculture. The degree of M.A. is conferred for one year's resident graduate study. Alfred University is governed by a self-perpetuating board of 33 trustees. The institution is a member of the Association of Colleges and Preparatory Schools in the Middle States and Maryland (see College Entrance Boards). There are no college fraternities. The grounds and buildings, valued (1906), with equipment, at $279,000, occupy an unusually beautiful site among high hills near the village of Alfred, the headquarters in America of the Seventh Day Baptists. The total income (1906) was $40,019. The average salary of a professor is $900. There are (1909) 14 members on the instructing staff, of whom 12 are full professors. The college has 120 students. Boothe Colwell Davis, Ph.D., is president. C. G.

ALGEBRA. — General Nature of the Subject. — The term algebra has had several meanings in the development of the subject as we now understand it, and even at present it is used in a rather undefined sense. As first used, the term referred to the science of the equation, as will be seen in the article given below on the history of algebra. With the development of symbolism, as explained below, it came to refer to that part of mathematics that teaches the use of letters to represent numbers, not merely in equations but in operations essential to the study of more advanced mathematics, such as the fundamental operations resembling those of arithmetic. Among the various attempts to define algebra may be mentioned Newton's characterization of the subject as "universal arithmetic," the more common one of "generalized arithmetic," and Comte's expression, the "calculus of functions," as distinguished from arithmetic, which is the "calculus of values." None of these attempts is more than a mere epigram. The fact is that mathematicians do not find it necessary or profitable to attempt any exact definition of the science. It is the calculus of certain functions, and in general these functions are those involving addition and an inverse, multiplication and an inverse, involution and an inverse. Thus, besides $a+b=c$ we have $a=c-b$, and $b=c-a$; besides $ab=c$ we have $a=c\div b$, $b=c\div a$; besides $a^b=c$ we have $a=\sqrt[b]{c}$, but $b=\log c\div\log a$ is commonly excluded from elementary algebra, and $\log a$ is not considered as an algebraic number. Algebra is commonly considered at present to mean that part of mathematics which uses letters to represent numbers, which treats of the operations of arithmetic performed with numbers represented in this manner, and which emphasizes the use of the equation (*q.v.*). Higher algebra is taken to include such topics as symmetric functions (see Function), power sums (see Power), the proof of the fact that every algebraic equation has a root, number congruences (see Congruence), continued fractions (see Fraction), determinants (*q.v.*), and various other theories needed in advanced work.

History. — The first traces of algebra are so mingled with those of geometry that it is difficult to say to which subject they should be assigned. Thus there is reason to believe that the Babylonians knew the law that we express in modern symbols by $(a+b)^2=a^2+2ab+b^2$, a law that may very likely have come from geometry, but that also may have been derived inductively from a study of numbers. The first definite trace of algebra comes to us from an Egyptian work, in which the subject appears already in a rather advanced state. This manuscript on papyrus was written by a scribe named Ahmes (*q.v.*) about 1700 B.C., but was copied from an earlier work. In this treatise are found a few crude mathematical symbols, the linear equation appears as applied to a few simple problems, and there is a slight treatment of arithmetical and geometric progressions. The first equation known appears in this work in the form "Heap, its seventh, its whole, it makes 19," and this in modern symbols would appear as $\frac{x}{7}+x=19$.

The algebra of the golden age of Greek mathematics was merely a phase of geometry. Aristotle went so far as to represent quantities by letters of the alphabet, saying, "If A is the moving force, B that which is moved, Γ the distance, and Δ the time," etc., but such literal notation was exceptional at that period. In general the algebraic knowledge of the Greeks of that time was confined to such theorems as could be developed by geometry. In this way they were aware of the truths which we would now express by

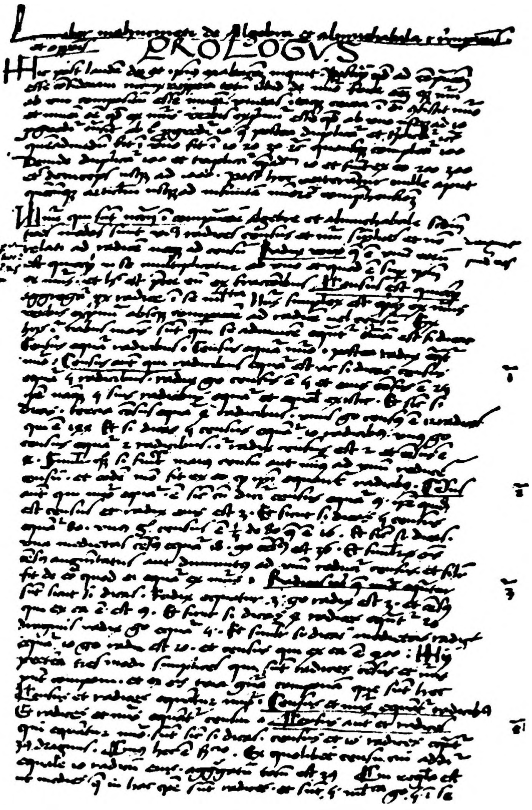
$$(a+b)^2=a^2+2\,ab+b^2,$$
$$(a-b)^2=a^2-2\,ab+b^2,$$
$$(a+b)(a-b)=a^2-b^2,$$

and this involved a knowledge of how to "complete the square," that is, of adding b^2 to $a^2 \pm 2\,ab$.

The greatest algebraist of Greece was Diophantus (*q.v.*), who lived about 275 A.D. He used special symbols for the unknown quantity, and also for its various powers so far as he needed to use them. The unknown was a symbol, the meaning of which is not certain, but it resembled a final sigma, ς. The powers from 2 to 6 were represented by δ^{υ}, κ^{υ}, $\delta\delta^{\upsilon}$, $\delta\kappa^{\upsilon}$, $\kappa\kappa^{\upsilon}$, for δύναμις, κύβος, etc., a symbolism that was not improved upon until the time of Descartes (*q.v.*). The interest of Diophantus was largely in indeterminate equations (*q.v.*), but he could solve the quadratic equation and special forms of the cubic. His work differs notably from that of his known predecessors in being analytic rather than geometric, and from that of the oriental writers who came after him by being confined to pure mathematics.

Algebra next flourished almost exclusively in the East. In India there were four great writers, Aryabhatta (*q.v.*), who lived about 500 A.D., Brahmagupta (*q.v.*), about 625 A.D., Mahāvīrārcārya (*q.v.*), about 850 A.D., and Bhaskara (*q.v.*), about 1150 A.D. Their works are in rhetorical form, *i.e.* with the problems written out at full length and with no symbols. The nature of the questions proposed by these oriental writers will be understood from the following problem from Mahāvīrārcāya: "One fourth of a herd of camels was seen in the forest; twice the square root of that herd had gone to the mountain slopes; and three times five camels remained on the bank of a river. What is the numerical measure of that herd of camels?"

Algebra next flourished in China and among the Arabs and Persians. The Chinese contributions have not been thoroughly studied, but those of the Arabs and Persians are well known. The leading writer of the Bagdad school was Mohammed ibn Musa al-Khowarazmi (*q.v.*), who flourished about 830 A.D., and whose name appears in the word *algorism* (*q.v.*). He wrote the first book in which the word algebra occurs, the title being *'ilm al-jabr wa'l muqābalah* (*the science of restoration and comparison*), a name that appeared in the Latin translations as *ludus algebrae almucgrabalaeque*, and in the sixteenth century English as *algiebar and almachabel.* Among the other oriental writers of note was Omar Khayyam (*q.v.*), whose work on the cubic equation was in advance of that of his predecessors.



PROLOGVS

Page of a Latin Manuscript of Al-Khowarazmi of 1456. (Plimpton Library.)

The first medieval writer of importance was Leonardo Fibonacci (*q.v.*), about 1200 A.D. In the sixteenth century algebra attracted much attention in Italy, and the cubic and quadratic equations were solved through the efforts of Tartaglia (*q.v.*), Cardan (*q.v.*), and their contemporaries. In Germany Rudolff (*q.v.*) and Stifel (*q.v.*) were the leaders in this period and assisted materially in perfecting the symbolic work. One of the Italian names for the subject at this time, *Arte maggiore*, comes from the late Latin *Ars major* and *Ars magna*, terms used to distinguish algebra from arithmetic (*Ars minor*). It was also called *La regola della cosa*, from *cosa*, the Italian for the Latin *res*, thing, which had been used for the unknown quantity.

From this came the German *Coss* and English *Cossic Art.*

The present symbols of algebra date chiefly from the period 1550 to 1650, including the symbols x, y, . . . for unknowns and a, b, . . . for knowns, due to Descartes (*La géométrie*, 1637). From the middle of the seventeenth century to the present time the development of algebra has been chiefly beyond the elementary theory.

Present Status in the Curriculum. — In the schools of the United States algebra is at present generally taught in the first year of a four-year high school course, or in the ninth school year beyond the kindergarten, and in half of the eleventh school year. The general plan is to cover the four fundamental operations with integers and fractions, factoring, powers and roots, linear equations with one, two, or three unknown quantities, and quadratic equations with one unknown quantity. This year of work is generally followed by a year in plane geometry. Half of the next year, the eleventh in the pupil's course, is usually devoted to algebra, reviewing the preceding work and completing the elementary work through quadratic equations with two unknown quantities, including easy radical equations.

There is at present a strong movement in favor of using the linear equation with one unknown quantity, and also simple formulas in algebraic language, in the work in arithmetic in the elementary grades, and in particular in the seventh and eighth school years. There is also a very marked tendency to change the traditional high school course of four years to a course of five or six years, beginning in the eighth or seventh school year. The effect of this plan will be to complete the essentials of arithmetic in the elementary school (the first six school years), to review arithmetic in the high school (the second six school years), and to extend algebra over a longer period in the high school. This might profitably be done without taking any more time for mathematics than at present. The result, if we can secure as good candidates for teaching as are secured in the older countries, will be a much better training in algebra before the pupil enters college or goes into business.

The textbook in elementary algebra is merely a development of the sixteenth-century textbook in arithmetic. One of the first successful works of this kind was the Algebra by Christopher Clavius (*q.v.*), a Jesuit teacher, who went from Germany to Rome and published this textbook in 1608. The general plan of the book is similar to that of his *Epitome Arithmeticae Practicae*, which appeared in 1583 and which went through several editions, — first notation, then the operations with integers, then fractions, and then equations. There has of late been a tendency to change this plan, and to introduce algebra by showing the uses of the formula and of the linear equation with one unknown quantity; in other words, to make the transition from arithmetic to algebra less marked.

In the continental European schools it is the custom to introduce abstract algebra earlier than is usually the case in America. This is accomplished by combining it with arithmetic more fully than is done here; by having less arithmetic taught, partly because of the freedom from the difficult system of compound numbers that is still used in England, Canada, and the United States; and by having more vigorous teaching than is the general custom in the Western hemisphere. Thus in the *Normallehrplan des Gymnasiums* of Austria, of 1909, algebraic notation, the negative number, and the geometric-algebraic significance of $(a + b)$, $(a - b)^2$, $(a + b)(a - b)$, $(a + b)^3$, etc., are introduced in the sixth school year. In the seventh school year linear equations with several unknowns and the quadratic equation with one unknown are studied. In the eighth year this work is elaborated, and in the ninth year, at a time when the American schools are usually beginning algebra, the subjects of logarithms, complex numbers, and the easier forms of higher equations are being studied. A somewhat similar state of advancement is seen in the curricula of several of the German states and in the mathematical classes of France. These facts have raised the question as to whether the schools of England and America are utilizing to the best advantage the time assigned to mathematics. D. E. S.

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On the present status : —

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YOUNG. *The Teaching of Mathematics.* (New York, 1907.)

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The files of *L'Enseignement Mathématique*, of Schotten's *Zeitschrift für mathematischen und naturwissenschaftlichen Unterricht*, and of other current educational journals of approximately equal rank.

ALGEBRA AND GEOMETRY IN THE GRAMMAR GRADES. — The idea of introducing algebra and geometry in the elementary school arose from the feeling that too much arithmetic was required and that the foreign mathematical curriculum might profitably replace the American. By the foreign plan less arithmetic has been required than in the United

States, allowing time for some work in literal notation at least, and in some form of geometry.

The idea is plausible, but like all new ideas it has not been sufficiently considered by some of its advocates. Granted that there is some time available for algebra and geometry in the last six years of the elementary school, what should be the nature of this work?

As to algebra, the first experiments led to an attempt to use a considerable amount of literal notation simply because it was part of algebra. Removing of signs of aggregation, performing the various operations with integers and fractions, and the solution of a rather meaningless lot of equations, formed the body of the early work as attempted abroad and in America. This has, more recently, given place to a more rational use of algebra as a part of arithmetic. (See ARITHMETIC). The use of x in a simple equation has come to be allowed in the solution of arithmetical problems, to the material benefit of arithmetic. The use of the formula, in the ordinary algebraic symbolism, has come to be a recognized part of arithmetic, as in $a = \pi r^2$. In other words, the part of algebra that throws light upon and correlates with arithmetic has been adopted, not as a separate subject, but as something to be assimilated with the older science.

There are, however, many schools in which it seems best to introduce an elementary textbook in algebra in the eighth school year, replacing the arithmetic entirely. For such schools several good manuals of elementary algebra have been prepared. The best of these begin by showing the practical uses of algebra, usually in formulas with which the pupils are familiar. They then show the use of the simple equation in the solution of the problems of ordinary arithmetic. This is followed by the nature of the negative number and its practical applications. The fundamental operations with integers and fractions are treated in a simple fashion, and the work closes with further practical problems in simple equations and easy quadratics.

Each of these plans is usable, and each is adapted to particular types of school. The plan of introducing the abstract algebra of the high school into the elementary grades is not, however, to be commended.

The introduction of geometry into the elementary grades has not been so successful. It is true that in the best English schools Euclid is taught in what we would call the grammar grades, but this does not appeal to American teachers as an educational policy to be followed. The work is too abstract and too logical to be understood, and the gain of mere memorizing is offset by the loss in interest. In Germany there are some good textbooks in demonstrative geometry, adapted to the grades. These, however, do not appeal to the American teacher as usable here. While better for the purpose than Euclid, they are lacking in interest and in motive. It is a mistake, however, to feel that America has done nothing in this field. There has always been a considerable amount of work in mensuration in our arithmetics. Formerly this was, like arithmetic in general, merely a matter of rule; but for some years back there has been a successful effort made to render this work clear to the understanding, intuitional if not logical in the formal sense. As a result, the work in mensuration now given in the best American arithmetics is a very satisfactory solution of the problem of introducing some geometry into the grades.

Efforts have been made, but with no marked success, to construct a geometry suited to the grammar grades. These have thus far taken the form of textbooks on constructive geometry, on observational geometry, and on an elementary type of demonstrative geometry. These works serve a good purpose in that teachers see how to make the subject of mensuration more real, but they have not had any marked influence beyond this point. Further improvement in the field of geometry in the grades seems to lie (1) in the securing of a larger number of practical problems in mensuration, adapted to the interests of the children, and possibly (2) in the preparation of a textbook in geometry similar to the several textbooks in algebra for beginners. D. E. S.

See also GEOMETRY, and CONSTRUCTIVE GEOMETRY.

ALGERIA. — Recognized educationally as an academy of the University of France or as a division in the central administration of French education.

See FRANCE, EDUCATION IN.

ALGOMETER. — An apparatus by which the sensitivity of the skin to pain can be measured. It consists of a blunt point which may be pressed against the skin, a handle to be used in pressing, and a spring which serves both to hold the pressing point in position and as a gauge to measure the amount of pressure. The test for pain has been regarded as of importance because there appear to be great individual differences in sensitivity to pain, and some evidence exists which tends to show that habitual criminals are especially insensible to such stimulations.

ALGORISM. — A word used in the late Middle Ages to mean arithmetic according to the method of the Arabs, as distinguished from that in which the abacus (*q.v.*) was used. Advocates of algorism were often called algorists, while those who preferred the abacus were called abacists. The words were finally used interchangeably, however, their original meanings having been forgotten. Thus we have Borghi's *Libro de Abacho* (1st ed., Venice, 1484), which does not mention the abacus, while

Huswirt's *Enchiridion nouus Algorismi* (1st ed., Cologne, 1501) is largely devoted to the counter reckoning.

The name comes from the Latin translation of the first Arab arithmetic known in which the Hindu system of notation was employed. The work was written by Mohammed ibn Musa al-Khowarazmi (Mohammed the son of Moses, the Kharezmite), who lived in Bagdad about 830 A.D. Commonly known as al-Khowarazmi, the Latin translation gave as the title of his work, *Liber Algorismi*. From this, books of this nature came to be called, without much attention to case endings, by such names as *Algoritmus*, *Algoritmi*, *Allegorithmum*, *Algorismus*, and *Alghoarismi*. The change of *al* to *au*, owing to French influence, gave *augrim* and allied forms in English of the thirteenth century.

Of late the term "algorism," less correctly spelled "algorithm," has been used to refer to any particular arrangement of figures in an operation. Thus we speak of the various algorisms of division, such as short division with the quotient below, long division with the quotient above, and the older style of long division with the quotient at the right.

D. E. S.

ALIEN PRIORIES. — Long before the Conquest various continental religious houses were extensive landowners in England, and established cells or dependent houses on their lands. An early instance of this was the Priory at Ghent, which acquired from the daughter of King Alfred the extensive lands which were subsequently comprised in the manors of Lewisham and Greenwich. These they held till the fifteenth century. This was one of very many examples. Since these priories appointed to the livings on their lands, they had an important influence on local education, which was, in the matter of elementary education, in the hands of the local priests. But the branch priories themselves seem to have had important schools, for Stow (writing before 1598) definitely states that when Henry V in 1415 finally suppressed the priories these schools were broken up and ceased, and he apparently refers to four London priory schools, *i.e.* Our Lady of Rouncivall at Charing Cross, Oldborne, Cripplegate Without, and Aldersgate Without (Stow's *Survey of London*, Book I, p. 54, ed. 1603). The final suppression of the Alien Priories in 1415 (Rot. Parl., Vol. IV, p. 22) therefore marks a definite stage in the dissolution of medieval education, and the destruction thus wrought requires careful estimation. The question has not yet received adequate investigation. The Commons, as early as 1346, had petitioned King Edward III (2 Rot. Parl., p. 162, No. 19) that the abbeys and priories of the alien monks should be devoted to the education of young English scholars, since for some time they had lost the opportunity of learning. The king rejected the petition on the ground that Parliament had no jurisdiction and that he himself had taken the profits of the lands and benefices. This is evidence that as early as 1346 education had suffered loss by the partial suppression of the priories. At the final suppression in 1415, when 146 alien priories disappeared, the king at first intended to found a "noble college" at Oxford out of the proceeds. But his death prevented this, and Henry VI applied some of the lands to the endowment of Eton College, Windsor, and King's College, Cambridge. (See Tanner's *Notitia* (1744) and *Some Account of the Alien Priories* (1786), which last work gives a list of the lands devoted to educational uses.) The bulk of the Alien Priory lands were, however, appropriated to private uses.

J. E. G. DE M.

ALIENIST. — The specialist who makes a study of pathological mental processes. See PSYCHIATRY and ABNORMALITIES.

AL-KAYAMI. — See OMAR KHAYYAM.

AL-KHOWARAZMI.— Abu 'Abd Mohammed ibn Allah Musa al-Khowarazmi was the greatest teacher of algebra in the famous mathematical school of Bagdad. He was born in the province of Khwarazm, in the vicinity of the river Oxus. He died at Bagdad about 831 A.D. He wrote the first book entitled Algebra (*q.v.*), viz. *'ilm al-jabr wa'l muqābalah* (*the science of restoration and comparison*), so called because in an equation (comparison) we take from one side and restore to the other side. Al-Khowarazmi called the unknown quantity "the thing" or "the root." From the former came the use of *res* in the Latin works based upon the Arabic treatise, and hence the Italian *cosa* (thing), and hence the German *coss* and the English *Cossic Art* for algebra. From the word "root" came our expression, "the root of an equation." Al-Khowarazmi first treats of algebra by rules without proofs, and follows this by certain geometric demonstrations of these rules, after the manner of Euclid. The first plan was Hindu, the second Greek, al-Khowarazmi being the first to combine the two methods. His work also contained a treatise on arithmetic, and from his name is derived the word "algorism" (*q.v.*). It appeared in English, translated by Rosen, in 1830. Like all oriental names, al-Khowarazmi's is variously transliterated, appearing also as Alkarismi, al-Khowarizmi, and al-Khuwarizmi. (See fig. on p. 91.) D. E. S.

ALL HALLOWS COLLEGE, SALT LAKE CITY, UTAH. — Founded in 1886 and placed under the control of the Marist Fathers in 1889. Boys are received on completion of their sixth year into a special department. Primary, academic, classical, scientific, commercial, and post-graduate courses are offered.

Degrees are given in the scientific and classical departments upon a four years' preparatory course which render a student eligible for matriculation in any of the leading universities.

ALLEGHENY, CITY OF. — A city of the second class, under the laws of Pennsylvania, first incorporated in 1840, and organized as a school district, under the Board of Controllers in 1854. In 1900 the city had a total population of 129,896, and in 1907 its estimated population was 147,632. Its school census, 6–21 years of age, was estimated at 24,000 in 1909, and its total day school enrollment 20,405. Twenty-eight hundred children in the city were estimated as enrolled in private and parochial schools. Twenty-three per cent of the population of the city in 1900 was foreign-born, one half of this number was German, one sixth Irish, and the remainder widely scattered.

The city employed a total of 403 teachers and 29 supervisory officers in 1907–1908, the year of the last report, and provided a school term of 200 days. Thirteen teachers were employed in evening schools, 44 in kindergartens, and 27 in the high school. The total expenses for maintenance in 1907–1908 were $677,691. The city provides free textbooks, gives instruction in manual training and domestic science in the schools, and has a compulsory education department. The one high school offers academic and commercial courses, and has a graduate year of city normal school work for the training of new teachers for the city.

The school department is under a Board of Controllers of 90, subdivided into 15 ward boards of 6 members each, elected by wards for three-year terms, and each ward board has a president and a secretary. There are 15 committees of the central board, with a representative from each ward on each. Meetings of the central board and of the different ward boards are held, and authority is divided between them. The ward boards have authority under the law to purchase lots; erect and repair buildings; purchase apparatus, stationery, books, furniture, and fuel; pay janitors; borrow money for such purposes, and levy taxes to pay interest and principal. The Board of Controllers has charge of the public library of Allegheny as well as the schools. E. P. C.

References: —

Annual Reports Board of Controllers, 1854–1908. (*Annual Reports of Superintendent* included since 1874.)

ALLEGHENY COLLEGE, MEADVILLE, PENNSYLVANIA. — A coeducational institution, founded in 1815 by citizens of Meadville, then a frontier village of 400 inhabitants. The college was chartered in 1817, and in 1820 the corner stone was laid of the first building, Bentley Hall. Admission is by examination or certificate from an approved high school; the college aims only to supply a liberal education. A preparatory school is maintained, known as the Allegheny College Preparatory School, which is under the control and supervision of the college, but which has its own building and a distinct corps of instructors. Graduate courses lead to the degree of M.A. A joint board of control, elected by the Erie, Pittsburg, West Virginia, and East Ohio conferences of the Methodist Episcopal Church, nominates three persons, one of whom must be elected to fill each vacancy in the Board of Trustees, which has 50 members. Fraternities have been established as follows: Phi Kappa Psi, Phi Gamma Delta, Delta Tau Delta, Phi Delta Theta, Sigma Alpha Epsilon, Kappa Gamma, the last two being women's societies; Alpha Chi Omega, 1891, a women's musical society; and Beta Sigma, local. Allegheny College is a member of the Association of Colleges and Preparatory Schools in the Middle States and Maryland (*q.v.*) (see College Entrance Boards). There are 10 buildings, valued (1906) with grounds and equipment at $440,000, and situated on a campus of unusual beauty, through which runs a ravine. The total annual income averages $50,000. The average salary of a professor is $1800. There are (1909) 322 students, of whom 122 are women. The instructing staff numbers 22; 14 are full professors. William H. Crawford, D.D., is president. C. G.

ALLEN, FORDYCE ALMON (1820–1880). — Schoolman, educated in private schools in Philadelphia and at the Alexander Classical School in New York; teacher and institute instructor (1840–1854); instructor in State Normal School at West Chester, Pa. (1854–1857); principal of the same (1857–1864); principal of the State Normal School at Mansfield, Pa. (1864–1880); author of a *Primary Geography* and of numerous papers on education. W. S. M.

ALLEN, JEROME. — Educator and author, born at Westminster, Vt., July 17, 1830; educated in public and private schools and at Amherst College; instructor in Maquoketo Academy (1835–1855); professor in Alexander College (1855–1859); president of Knox College (1859–1869); superintendent of schools at Monticello, Ill.; principal of the State Normal School at St. Cloud, Minn. (1881–1884); professor of pedagogy in New York University (1887–1893); author of *Map-drawing*, *Mind Studies for Teachers*, and *Temperament in Education;* editor of Barnes' *Educational Monthly* (1876–1880) and *School Journal* (1884–1890); died of May 26, 1894. W. S. M.

ALLEN UNIVERSITY, COLUMBIA, S.C. — A negro institution incorporated by the legislature of South Carolina in 1880. The trustees are elected by the Conference of the African Methodist Church in South Carolina. Courses are offered in theology, law, sciences, classics, fine arts, industry, and commerce. Primary and preparatory departments are maintained. Approximately two and a half years' high school work are required for entrance. Degrees are conferred. The degree of Licentiate of Instruction gives the graduates the privilege of teaching in the public schools of the state without examination. There is a faculty of 16 professors, instructors, and assistants. Wm. D. Johnson, D.D., Ph.D., is president.

ALLEN, WILLIAM, D.D. — Born at Rossall in Lancashire in 1532, was principal of St. Mary's Hall, Oxford, when, owing to the change of religion consequent on the accession of Elizabeth, he left and took refuge in the Low Countries. In 1568, in company with other Roman Catholic exiles, he founded a college at Douay, in Flanders, where there was a new university already under Oxford influences, in which Allen himself became Regius Professor of Divinity. The object of his college was to afford facilities for exiled Catholics to continue their studies, and the Douay Bible (N.T. 1582; O.T. 1609–1610) and many controversial and other works bear witness to their literary activity. But it soon grew also into a missionary college for educating priests to return to England and preach the Roman Catholic religion. As such it continued (with the exception of fifteen years, 1578–1593, when it was temporarily transferred to Rheims) for more than two centuries, until it came to an end during the Terror in 1793.

In 1575 Allen visited Rome, and established a similar college, which continues to the present day. Ten years later he took up his residence there. He was made cardinal in 1587, and took part in the revision of the Vulgate, which was still incomplete when he died in 1594.

Reference: —

See *Dictionary of National Biography.*

ALLEN, WILLIAM (1770–1843). — One of the prominent leaders in the educational and philanthropic movement in the first half of the nineteenth century in England. Born in 1770, he was brought up under principles of the Society of Friends. He was employed in his father's silk business at Rochester. His scientific interests, however, took him to London, where he opened a chemical laboratory at Plaistow. When he was but 30 years old he refused to accept a fellowship in the Royal Society. In 1801 he became a fellow of the Linnæan Society, and in 1817 of the Royal Society. With some scientific friends, he was active in founding the Askesian Society. From 1802 to 1826 he lectured at Guy's Hospital. His interests, however, were very wide. He was early attracted to the movement for the abolition of the slave trade and slavery. But he is chiefly known as an energetic worker in the British and Foreign School Society (*q.v.*). He was a member of Lancaster's committee in 1804, and became treasurer of the society in 1811. In connection with this movement he traveled widely in Europe, and succeeded in interesting Czar Alexander of Russia (*q.v.*) in the work, with the result that several Russian boys were sent to the Borough Road School. In 1818 he made selections from the Bible for use in the British schools, which were translated into Russian. Allen was also actively interested in the New Lanark movement with Bentham (*q.v.*) and Robert Owen (*q.v*). About 1835 he turned his attention to an agricultural colony and industrial school at Lindfield in Sussex. Allen died in 1843.

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ALLEN, WILLIAM HENRY (1808–1882). — Educator and author, educated at Maine Conference Seminary and at Bowdoin College; instructor in Cazenovia Seminary (1833–1836); professor in Dickinson College (1836–1850); president of Girard College (1850–1862), of Pennsylvania College at Gettysburg (1865–1866), and again of Girard College (1867–1882); author of a number of pamphlets and reports on education. W. S. M.

ALLENTOWN COLLEGE FOR WOMEN, ALLENTOWN, PA. — An institution established in 1866 and controlled by the Eastern Synod of the Reformed Church. Courses are offered to girls between 8 and 18 in elementary, academic, and collegiate departments. Courses in fine arts are also provided.

ALLEYN, EDWARD (1566–1626). — A well-known actor of Queen Elizabeth's reign, who became largely interested in theater property. In 1605 he purchased the manor of Dulwich, and between 1613 and 1616 he founded Dulwich College, Kent. Already Thomas Sutton had established the famous Charterhouse Hospital and School in 1611. The Puritans inveighed against play-acting, but in Alleyn's foundation of Dulwich it was clear that an actor could be as public-spirited as themselves. The Anglicans were establishing Chelsea College as an institution to afford maintenance to learned men, set apart to answer the Catholic disputants. They appealed, unsuccessfully, to Alleyn to give his money to their purposes. Alleyn secured the services of Inigo Jones as architect. As originally constructed, the "College" consisted of a chapel, a schoolhouse, a kitchen, offices, and twelve dormitories. The set of buildings was named "The College of God's Gift." The dramatist, Thomas Dekker, about this time (1616) in great poverty, wrote some verses to Alleyn in praise of his charity. The

Earl of Arundel wrote to ask Alleyn to " accept a poor fatherless boy to be one of the number " of scholars. The founder chiefly chose for his college those resident in St. Botolph's parish in Bishopsgate, where (strange coincidence) Stephen Gosson, the author of the *School of Abuse*, 1579 (an invective against play actors) was the rector. Gosson's letters, however, show that he grew into high respect for Alleyn. By 1620, in addition to the 12 poor boys on the foundation, who were gratuitously fed, taught, and clothed, boys were also accepted as boarders, and educated in the school. Provision was made for a master, a warden, 4 fellows, 6 Poor Brethren and as many Sisters. The hospital was to be similar to Archbishop Whitgift's hospital at Croydon. As foundationers, boys of the name of Alleyn or Allen were to be preferred. The college was opened with great ceremony in 1619, in the presence of Lord Chancellor Bacon. The Founder's Statutes, 1626, extended the benefits of the school to sons of residents in Dulwich, and as many others as would make up the total number of boys in the college school to 80 in all. The college was reconstituted by Act of Parliament in 1858. F. W.

ALLIGATION. — Until recently an important chapter in arithmetic, and still taught in a number of European countries, as in the *Mischungsrechnung* of the German schools. It is a crude method of solving linear equations, often indeterminate ones, and is first found in the form in which we have received it in the early Hindu arithmetics. Thus Bhaskara (*q.v.*) in his *Lilāvati* makes use of it, it being particularly suited to the fanciful problems of the East. It played but little part in the medieval arithmetics of Europe, but as the *Regula Alligationis* it became very prominent in the sixteenth century. The word is from the Latin *ad*, to, and *ligare*, bind, and is related to the words *alloy* and *ally*, and of course to the French *alliage*. The Dutch arithmeticians translated it as *Den Reĝhel van Menginghe*, *Rekeninghen van Mengelingen*, *Alligationis ofte Meñginghe*, etc., and the French used both *alliages* and *alligation*. In English, alligation has been the favorite name, although Recorde (*c.* 1542) remarked that " it might be well called the rule of Myxture." The reason for the prominence of the subject in the sixteenth century was the great increase in coinage, necessitating the mixture of alloys, problems of this kind being classed under such heads as *Del consolare dell' oro e dell' argento* in Italy, *Silber Rechnung*, *Goldt Rechnung*, and *Kupfer Rechnung* in Adam Riese's German arithmetics, and similarly in other countries. Robert Recorde (*q.v.*) seems to have been the first English writer to suggest the application of alligation to other problems than those relating to alloys, saying, " it hath great vse in composition of medicines, and also in myxtures of metalles, and some vse it hath in myxtures of wines, but I wishe it were lesse vsed therin than it is now a daies." A specimen of the problems of alligation is the following from Vander Schuere's (1600) Dutch arithmetic: " A brewer has 100 tuns of 5-gulden beer in a vat; how much water must he mix with it to produce 3-gulden beer ? "

The subject was generally dropped from American arithmetics in the last quarter of the nineteenth century, chiefly because it included no real modern problems, and did not represent modern methods of solution. D. E. S.

ALLOCHEIRIA (or **ALLOCHIRIA**). — The subjective transference of a sensation to the opposite and corresponding half of the body, so that a touch or other stimulus on one leg or arm or side is localized on the opposite side. It is a symptom found in a few organic nervous diseases and commonly in hysteria. S. I. F.

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ALLYN, ROBERT (1817–1894). — Educator, attended the public schools of Connecticut and Wesleyan University; instructor in Wilbraham Academy and principal of the same (1841–1848); principal of academy at East Greenwich, R.I. (1848–1854); state commissioner of schools of Rhode Island (1854–1857); professor in the Ohio University at Athens (1857–1859); principal of Wesleyan Female College at Cincinnati (1859–1863); president of McKendree College (1863–1874); principal of the Illinois State Normal School at Carbondale (1874–1892). W. S. M.

ALMA COLLEGE, ALMA, MICHIGAN. — A coeducational institution founded in 1886. The first Board of Trustees was elected by the Synod of Michigan; new members of the board are nominated by the trustees, subject to confirmation by the synod. There are 20 trustees, each serving four years. The college is one of 31 institutions reporting to the Presbyterian College Board (*q.v.*). The institution maintains the usual undergraduate courses in arts and science, a preparatory academy, schools of music, art, and business, and a school of pedagogy mainly devoted to the training of kindergarten teachers. The college and school of pedagogy admit on examination and certificate of approved high school; the other departments require a common school education. A modified elective system is in effect; the college courses are offered in seven groups. Instruction in pedagogy to juniors and seniors leads, without examination by the state, to a state teacher's certificate. To graduates of at least two years' standing the degree of M.A. is given for one year's study in residence. There are no college fraternities. Including Wright Hall, a well-equipped dormitory for women, there are six buildings (1906), valued, with grounds and equipment, at $176,283. The total annual income is about $22,000. The average salary of a professor is $1000. There are 366 students (1909), divided as follows: College, 118; Academy, 39; Commercial School, 46; School of Music, 127; School of Art, 26. Ten of the 25 members of the instructing staff are full professors. August F. Bruske, D.D., is president. C. G.

ALMA COLLEGE, ST. THOMAS, ONT. — An institution for the higher education of women, founded in 1877 and under the control of the General Conference of the Methodist Church. Preparatory and collegiate departments are maintained preparing for university matriculation or for teachers (nonprofessional) examinations. The college is affiliated with the University of Toronto. Courses in fine arts and commercial subjects are offered. Diplomas are given on graduation. Rev. R. T. Warner, M.A., D.D., is the principal.

ALMA MATER. — Literally, *foster-mother*. Applied in classical Latin to the goddesses, including the Muses. The term is now applied as an expression of affection to the college or university which one has attended. The use is universal in English, American, and German universities. Compare in this connection the use of the terms " alumnus " (*q.v.*) and " matriculation " (*q.v.*).

ALMAGEST.— The great textbook on astronomy of the Middle Ages, written by Ptolemy (*q.v.*) in the second century of our era. The name comes from the Arabic *al-majisti*, from *al* (the) and a corruption of the Greek μεγίστη, feminine form of μέγιστος, greatest. The work consists of thirteen books, and includes a treatise on trigonometry. It remained the standard treatise on astronomy until it was superseded by the works of Copernicus and Kepler.

D. E. S.

ALMANAC. — A term probably derived from the medieval Spanish — the Arabic *al*, the, + *manākh*, calendar, possibly originally from the Greek or Latin. The term was introduced into Christian Europe by the astrologers, who adopted much of oriental mysticism, and has since been used to refer to an annual calendar. (See CALENDAR, COMPUTUS.) D. E. S.

ALMONRY SCHOOLS. — These schools, which began to be attached to monasteries in the fourteenth century, form one of the most striking proofs that the monasteries were not centers of general education and did not keep schools in the ordinary meaning of the term. The Almoner (*Eleemosinarius*), or charity distributor, was one of the " obedientiaries," or officers, of most, if not all, monasteries. It was his duty to distribute the broken meats, the " remainder biscuit," from the monks' meals at the gate of the monastery every day, and on certain days to distribute doles in money or kind among the poor, often as many as 1000 receiving a penny each. In some cases the general duty of taking in the poor and sick, for which especially many monasteries, notably Reading, were expressly founded, was discharged by setting up an inn (*hospitium*) or Spital (*hospitale*) outside the gates, in which generally 12 or 13 old or sick people were maintained at the expense of the Almoner, who, like the other officers, had special estates allotted to him out of the common monastic estate. The earliest mention of education connected with the Almoner is in about 1180, when the Archdeacon of Durham gave a manor to the Almoner of the Cathedral Monastery to supply free food and lodging for 3 boys from the public grammar school, to be nominated by the master. At the beginning of the fourteenth century a movement seems to have sprung up in connection with the great increase in the worship of the Virgin Mary, for the establishment of choristers in the Lady Chapels of the monastic churches, and special provision had to be made for their housing and education. It seems that this new development was not made out of the general monastic funds, but by special endowments given either by the Abbots or Priors or by outsiders. Thus, by deed of Feb. 16, 1319–1320, at Canterbury, Prior Henry of Eastry founded, probably out of a royal grant, a chantry of 6 priests to pray for the soul of Edward I, with the usual attendant clerks and choristers. It is implied that they had to attend the Cathedral school by the provision that on feast days when the schoolmaster does not lecture they are to attend all the canonical hours. Also it is laid down that no scholar shall be admitted to the Almonry unless he knows how to read and sing, and is 10 years old at least, and has a decent surplice commensurate with the size of his body. Though the Almonry boys were only fed on the broken meats from the monks' table, yet being one was regarded as a valuable form of scholarship, as is shown by a letter of Queen Philippa to the Prior in 1332, asking him to take Richard of Bedingfield into the Almonry " to be maintained like other poor scholars of his estate." The Prior consents, hoping in return that the Queen will prevent the king's purveyors from seizing the provisions he had collected for his own use while attending Parliament. In 1364 we hear of the schoolmaster of the Almonry being appointed master of the public school of his native town of Kingston-on-Thames. So by that time a separate schoolmaster, though probably only as a private tutor, had been provided for these Almonry boys. St. Alban's Abbey seems to have been the first monastery to follow the example of Canterbury, an " Order of living of the poor scholars in the Almonry " there being made April 4, 1339. The scholars were to stay five years at most, " as that time is sufficient for becoming proficient in grammaticals." They were to " shave an ample crown, like choristers," and daily say the seven psalms for the Convent and its founders. The sergeant, or servant of the Almoner, to whom their care was deputed, took oath to collect the broken meats of the monastery and faithfully distribute them to the boys of the Almonry and to friars and other beggars, and to instruct the boys to the best of his ability in morals and learning.

The first beginnings of the great public school of Westminster may be traced to the provision made for 2 boys' food and clothing, costing 32*s.* 6*d.* for the year, as shown in an Almoner's account roll for the year 1355. Their numbers were rapidly increased from that time, as in 1363 cloth for their gowns alone cost 24*s.* 5*d.* In 1367, a " master of the boys " appears. In 1373, another account shows that there were 13 boys living in what is then called the Sub-Almonry, and the master received 13*s.* 4*d.* a year. In 1380, the master is for the first time called a grammar master, when there were 28 boys. From 1388 onwards, he is called Schoolmaster (*magister scolarum*), and in 1394 his stipend by a new agreement was doubled, £1. 6*s.* 8*d.* He had board and lodging as well. Probably the boys attended one of the three public schools of London. Then a school was built for them on the spot, items for its repair occurring in 1414 and for its rebuilding in 1422. The payments for cloth for the boys' gowns was raised in 1400 by the Abbot's express orders from 50*s.* to £6. 8*s.* and £7. a year. The master's salary was raised to £2. in 1479, when a distinction appears between the " grammar boys " and the " singing boys " who were now provided with a separate singing master. So the school continued to the dissolution of the abbey in 1539, the normal number of boys appearing to be 24. When the abbey was refounded next year as a cathedral, the number of grammar school boys to be maintained out of the foundation was raised to 40, and this number of resident King's scholars is still kept up. At Durham, a similar Almonry School appears first in 1350, when a payment is made for the "Almonry bishop," the boy bishop (*q.v.*) of the Almonry boys. A master of the boys in the Almonry is first mentioned in 1352, and in 1372 he is first called schoolmaster of the Almonry and paid £1. 14*s.* 3*d.* for his salary and gown. It was only on special feasts the boys had anything to eat but the broken meats from the monks' table; 7*s.* was paid for fresh meat for them for Advent, 1419. They were set to menial tasks. In 1448, 1 pennyworth of bread and beer was given them for tossing hay, and in 1457 1*s.* 5*d.* was spent in beer for them for getting stones. The Elizabethan "Rites of Durham" tells us how the broken meats for them were handed out of the pantry window of the Refectory, when they carried them to the Almonry just outside the great gate. When a monk died, the children of the Almonry spent the night by the corpse " sitting on their knees " and reading the Psalter till 8 A.M. It is probable they attended the bishop's or city grammar school, as, when the Priory was turned into a cathedral, which had to keep 18 King's scholars, the last master of the Almonry school became Usher, or Second Master, of the grammar school, the first Headmaster being the master of the city grammar school. At St. Mary's Abbey, York, the Almonry School, in which 50 boys boarded in a house called the Conclave or Chamber, attending the Cathedral or City School, is said to have been founded by William Rufus. But we may put this down as false history. On its dissolution, the same number was provided for in the Hospital annexed by Cardinal Pole to the Cathedral School, but this boarding house was soon discontinued. At Coventry, the Cathedral Priory kept 14 boys in its Almonry at a cost of £12. 11*s.* 4*d.* a year. In 1439, the Mayor and six of the Town Council arranged to see the Prior to tell him they were willing he should " occupye a scole of gramer " if he likes to teach his brethren and the children of the " Aumbry," but he was not to interfere with the freedom of the citizens as to the city school. At Norwich, the Cathedral Priory ought to have maintained in the Almonry 14 boys, but in 1520 the bishop found at a visitation that there were only 8. At Thornton Abbey, Lincolnshire, there ought also to have been 14 boys in the almonry, but the bishop in 1424 had to order 12 at least to be admitted. At Bardney Abbey, in 1379, the bishop ordered the monks, instead of wandering about the country, to observe their rule, stay at home, and maintain 6 boys to learn grammar (*pueri literati*). Similar provision was made in other monasteries. Probably not less than 2000 boys were thus provided with board, lodging, and education free, taking England as a whole. The schools were purely charity schools, the boys were made to feel that they were charity children, they acted as choristers and page boys to the monks, but they were taught and managed by secular clerks as masters. It is not probable that their education went beyond what choristers get now, except in a few special instances, such as Westminster. These schools were in historical times the sole contribution of the monasteries to education.

The only secular church in which an Almonry School has been found is St. Paul's, where the 8 choristers, afterwards increased to 10, hitherto living separately and fed by the canons in turn, were collected together and placed in the Almonry under the care of the Almoner on the north side of the cathedral, at the beginning of the fourteenth century. Many endowments were added for them when their voices " brast " and some of the 10 must have passed on, as Thomas Tusser, *c.* 1535, did to Eton, to other schools and the universities.

A. F. L.

ALPHABET. — In the widest sense of the term, " alphabet " connotes the sum total of signs and characters that form the basis of written language, so that it is theoretically proper to speak of the Assyrian or the Chinese alphabets, which are composed of a relatively small number of basal characters modified in various ways, until the ultimate quantity of signs becomes very large. Practically, however, the word " alphabet " refers only to that collection of syllabic characters in which a given language or group of languages is written; and it is thus distinguished from number signs, as well as from idiograms, or characters representing a word or series of words, as $, or the multiplicity of signs used in mathematics, astronomy, and other sciences. This restriction of the term, moreover, rules out what may be termed pictographic writing. This system is found in most primitive form among the American Indians, not only in their numerous pictographs properly so called, but in the historical records preserved, for example, in the " Lone-dog winter count " of the Sioux and the similar annals of the Kiowa and the Pima, as well as in the highly developed and probably quasi-syllabic value found in the writing of the Aztecs, the Mayas, the Hittites, and the Egyptians, yet it must be noted that it was exactly this pictographic theory which probably formed the basis of the complicated Chinese characters.

The term " alphabet " is of comparatively recent formation, occurring first in the ecclesiastical Latin of Tertullian and Jerome. It denotes, as is well known, the regular sequence of the first two letters of the Greek alphabet, *alpha* and *beta*, and finds analogues not only in the English *a-b-c*, but also in the Arabic *abjad*, the Old Irish *beth-luis-nion*, and the Germanic *futhork*.

Of all alphabets that which has had the widest and the longest currency is the Græco-Roman, which is the parent, with more or less modification, of all the modern occidental languages, and which, in its Roman, or modified Roman, form, is now almost universally employed when languages hitherto without script are reduced to writing. On the Greek side this alphabet furnished the foundation for the Slavonic scripts; and on the Roman for all those tongues whose speakers came under the control or the influence of the Roman Empire or Church. There is practically no room for doubt that the immediate parent of this alphabet is the Phœnician script, whose earliest known forms date from about 1000 B.C. (the " Baal Lebanon " bowls), though the best early specimen is the Moabite Stone, which dates from 890 B.C. This Phœnician alphabet consists of 22 letters, all of which are consonants. This is, indeed, characteristic of all Semitic alphabets allied to the Phœnician, the vowels being left undesignated, except in sacred texts (notably the Bible and the Qur'an) or in difficult poetry and elementary textbooks. The writing in Phœnician, as in the kindred Semitic alphabets, is from right to left, a usage which was also retained in the oldest Greek inscriptions, as well as in the ancient Kharoshthi script in India. But for some reason or other all the Indo-Germanic peoples, excepting the Iranians, who employed an Aramaic form of the Phœnician alphabet in both Avesta and Pahlavi, early felt objections to a script which ran from right to left. In India, therefore, as early as the fifth century B.C., the Brahmi alphabet, another variety of the Aramaic, had evidently begun to be written both from left to right and *boustrophedon*, as by the Greeks until about 500 B.C. The Oscans and Umbrians, before they accepted the Roman alphabet, also wrote from right to left, as was the case in Etruscan and in one archaic Latin inscription (the so-called " Duenos-inscription "); though the *boustrophedon* method was observed in the Old Sabellian texts and in an archaic Latin bronze tablet from the Lago di Fucino. Again, while many of the oldest Norse runic inscriptions, and practically all those outside the Norse region, are written from left to right, there was an early tendency to inscribe the runes from right to left, or to write them *boustrophedon*, or even in serpentine fashion. Normally, however, in the Indo-Germanic alphabets, even in Armenian, which is apparently a mixture of Greek and Aramaic types, the script runs from left to right, this also holding good of all Indian scripts except the Kharoshthi, all except the most archaic Greek and Latin alphabets, and all the scripts based upon them. Only in one outlying member of this alphabetic system, the Tibetan, which is based on Syriac, does the writing run vertically, as in Chinese and Japanese.

We have seen that the Phœnician alphabet was the parent of a vast number of scripts as far divergent as Roman and Sanskrit, Hebrew and Arabic; and it scarcely need be said that within each of these groups there are many subvarieties, separated not only chronologically, but also, even when used side by side, so distinct in form as to require the most patient palæographical research to show their ultimate kinship. But a further question arises which is by no means so easy to answer. What was the source of the Phœnician alphabet? Here the attempted solutions have been numerous. De Rougé and Taylor have maintained that the Phœnician script was based on the hieratic alphabet of the Egyptians; Deecke, Ball, and Zimmern, among others, trace it to the cuneiform writing of the Assyro-Babylonians; Evans cautiously suggests that the origin is to be sought in Cyprus; Petrie, followed by Clodd, would see in Phœnician script a selection from a large body of signs, apparently geometric rather than hieroglyphic in origin, which is held to have been current throughout the Mediterranean territory about 5000 B.C.; Lidzbarski and Delitzsch take an intermediate position, holding that both Babylonia and Egypt influenced the Phœnician alphabet; and Hommel has suggested that the source in question was the Minæan script of South Arabia, which he considers to be older than the North Semitic types. All these views have been submitted to a close criticism by Peters, who thinks it not impossible that the Phœnician alphabet shows traces of Babylonian, Egyptian, and Cretan elements; but that, in view of the names assigned to the letters in the nón-Babylonian Semitic languages and in Greek, the main element must probably be sought in Babylonia. It may, of course, be thought that the Phœnician alphabet was an independent creation. Such inventions are not unknown. An instance in point is the one Polynesian script of which there is any record. This is found on a few wooden tablets from Easter Island, though tradition, which is doubtless correct, declares that the alphabet was brought from some more eastern island whence the Easter Islanders emigrated; and a like assumption of invention seems best to explain the origin of the ancient Irish ogams. But with the Phœnicians this theory of independent creation is, on the whole, scarcely probable; for the Phœnicians were adapters rather than creators. In a word, the exact source of the Phœnician alphabet, and consequently that of our own script, is not yet definitely known.

Once an alphabet has been constituted, it is modified to meet the needs of other peoples who may adapt it. Thus the Greek alphabet has 24 letters, while the Russian, directly based upon it, has 37. The English alphabet has 26 characters, but the Cherokee, by modifying these signs and adding independent creations of its own, raises this number to 85. On the other hand, letters may be dropped. Greek early discarded the Phœnician *vau*, *koppa*, and *sampi* (except for numerals), and Pahlavi, based on an Aramaic variety of Phœnician, has but 14, giving rise, since many of these signs have several, often identical, values, to one of the most vexatious scripts ever devised.

It has already been said that the alphabet was primarily syllabic. This is true of the Semitic alphabets as a whole, where the vowels are not indicated normally; and it is in a measure true also of all the Indian scripts, which are ultimately of Semitic provenance. Thus in Sanskrit there is, for example, a sign indicating, not *n*, but *na*, and another indicating *ta;* but if one wishes to indicate *nta*, he must combine the radical part of the character for *na* with that for *ta*. This system, however, proved unacceptable to the Indo-Germanic peoples in general, for the Iranians on the one hand, adopting an Aramaic alphabet, and the Greeks on the other, using the Phœnician script, both introduced vocalic characters before the time of their first extant literary monuments. The very first letter of our own alphabet bears witness to this. In Semitic the first character, *aleph*, represents, not a vowel, but an extremely light guttural, which is exactly represented by the "smooth breathing" of the Greek alphabet. But in the earliest Greek, *alpha*, the letter corresponding, as its very name shows, to the Phœnician *aleph*, is not a guttural, but the vowel which we term *a*.

In the early period the letters of the alphabet had names, not the mere implication of the sounds for which they stand, as in our *be* for *b*. This is the rule in such Semitic languages as Hebrew, Syriac, Samaritan, and Ethiopic, and is also the case in Greek. Elsewhere the principle decays to a greater or less extent, as in Arabic and Armenian, while in Sanskrit there is but a single survival of the old practice in the name for *ra*, *repha* ("snarl"). In the Germanic runes there may be an unconscious return to the ancient use in the name *thorn* given to the character *þ*, which is immediately derived from the Roman *D*, and a Salzburg manuscript gives a complete list of names for the Gothic runes. This brings us to the origin of the names of the letters. The meanings of the designations of twelve of the Phœnician letters are practically certain. These are, giving them their Hebrew names, as being the most familiar, as follows: *aleph*, "ox"; *beth*, "house"; *daleth*, "door"; *yodh*, "hand"; *kaph*, "hollow of the hand"; *mem*, "water"; *nun*, "fish"; *'ain*, "eye"; *pe*, "mouth"; *resh*, "head"; *sin*, "tooth"; and *tau*, "mark." Three others, *gimel*, *lamedh*, and *samekh*, apparently are derived from Semitic triliteral roots; and the remainder are of onomatopoetic or of doubtful origin. With regard to those letter names of known signification, it may be suggested that they were named from being the initial letters of well-known words, *beth* as being the first letter of *beth*, "house," etc., precisely as if we called *a* "archer" and *b* "butcher" because of the nursery rhyme

> "A was an Archer, and shot at a frog;
> B was a Butcher, and had a great dog"; etc.

It has, indeed, been suggested by some scholars that the origin of the Semitic names for the letters is to be sought in the objects of which the letters in question are alleged to have been primarily pictographs, so that *beth*, for instance, would at first have been a pictograph or ideogram for "house," whence, since the initial sound of the word in question is *b*, *beth* itself came to denote *b*. This hypothesis is not, however, borne out by the earliest accessible forms of the Phœnician alphabet, for though this might possibly be urged in the case of *mem*, "water" (𐤌), *'ain*, "eye" (𐤏), or *sin*, "tooth" (w), it will scarcely explain *aleph*, "ox" (𐤀), *beth*, "house" (𐤁), *kaph*, "hollow of the hand" (𐤊), or *nun*, "fish" (𐤍).

In regard to the general form of letters it should be noted that the material on which they were originally written has largely conditioned their shape. The cuneiform characters, primarily engraved on wet clay, as may be seen from the numerous Sumerian, Assyrian, and Babylonian tablets, are straight, heavy strokes, with a marked indentation where the stylus was first pressed on the writing surface; the Irish ogams, first carved on stone, are either horizontal or oblique lines, or else dots, all suitable for simple working on stone; the Germanic runes, originally "scratched" (as the etymology of the English *write* shows) on wood, are plainly designed to avoid interfering with the grain; the South Indian scripts, traced with a sharp stylus on palm leaves, are characterized by curves, and an avoidance of straight lines, to prevent splitting the fiber of the leaf; and in Egypt, where the writing material was, from the earliest times, papyrus, an elaborate system of essentially pictographic writing could be developed. Of course, these principles are only general, for when an alphabet had once been formed, it was carried out even when written on materials for which it had not originally been intended. As examples of this we may perhaps cite the Maya pictographs on stone as compared with the manuscripts of the same people, or of the Aztecs and Zapotecs; or the wooden tablets of Easter Island, whose pictographic characters are obviously little suited to the material on which they are inscribed, so that probably these characters were primarily devised for some less fragile substance.

All alphabets consist at first of what might be called capitals, exactly as children to-day begin to learn their letters by making capitals. This is precisely the case with many oriental scripts, such as Hebrew, Arabic, and Sanskrit, where there is no distinction between what are called capital and small letters; and in Greek and Latin inscriptions all the writing is in capitals, as is also the case with the oldest extant manuscripts in these languages. But this sort of writing consumed time, and was unsuitable for rapid correspondence; and there accordingly developed a cursive script. Of this there are countless instances, among the earliest being the successive transitions in Egypt from the hieroglyphic to the hieratic, and from that to the demotic script; or the Hebrew "Rashi" cursive beside the conventional "square script." While the cursive is thus essentially a later development, it does not altogether supersede the capitals, which remain either for more formal writing, or to mark words to which special importance is attached (for an admirable example in English cf. Exodus iii, 14, vi, 3), or to show that certain words are nouns (as in earlier modern English and in German) or are proper names. As the cursive develops from the capitals, so by analogy cursive script evolves capitals of its own, the result being that alphabets based on the Græco-Roman system have, in reality, four distinct types of script.

In the light of what has already been said, the genealogy of the English alphabet may be summarized both clearly and briefly. The Phœnician alphabet, whose precise origin is not yet absolutely certain, was introduced into Greece, probably between the eleventh and eighth centuries B.C. Thence it was carried, in its Chalcidian variety, to Italy by Ægean immigrants, apparently about the eighth century. From Italy it passed, in the course of Roman conquest, to Gaul and Britain. And mainly from the Anglo-Saxon form the present English alphabet is directly derived. Into all the varieties of the English alphabet, of which phases survive in the "engrossing hand" and the like, there is no space to enter here. It would add no new principles, and properly belongs to the special study of palæography or diplomatics. The principal innovations of the English alphabet as compared with its immediate ancestor, the Roman, are only five. From the Germanic runes the Anglo-Saxons borrowed two signs — þ (or ð) for *th*, and ƿ for *w*, the former being imitated in the half-archaic *y*, as in *y*^{e} for *the*. In the Middle English period the French form of Roman script furnished the character ȝ, which had various values — a sound intermediate between *g* and *y*, though inclining to, and often interchangeable with, the latter (as *ȝal*, Anglo-Saxon *gyllede*, English *yelled;* yet cf. *aȝein* beside *aye*, "against"); the guttural sound represented by the modern *gh* in *daughter* (Middle English *doȝter*, Anglo-Saxon *dohtor*); and *s* or *z*, as *marchaunt*ȝ, "merchants." And in the earlier period of modern English *i* was divided into sonant (*i*) and consonant (*j*) functions, the latter receiving a letter modified from the former, while a special "double *u*" (*w*) was made from *vv* = *uu*.

L. H. G.

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ALPHABET, PHONIC. — See Phonetics.

ALPHABET, TEACHING THE. — See Reading, Teaching Beginning.

ALPHABET WHEEL. — One of the many devices for teaching the alphabet. In 1820 a Hartford publisher issued *The Revolving Alphabet or Child's Instructive Toy.* It consists of two circular pieces of wood, with a diameter of five inches, between which was placed a sheet of paper containing the alphabet on one side and a series of little syllables on the other. The paper could be revolved and a short column at a time of the print could be seen through an aperture in the disks. The alphabet wheel was one of the devices frequently used in the Lancasterian or monitorial system (*qq.v.*) of instruction.

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ALPHABETIC METHOD. — A special method in teaching reading to beginners, much used prior to the last quarter of the nineteenth century. The children were first taught the letters and names of the alphabet. They next spelled the words to be read, and with the approximate sound suggested by the spelling of the word as a guide, proceeded to the pronunciation of the word. If the simple words involved were already in the speech of the child, the spelling sounds usually sufficed to suggest the right pronunciation or quickly corrected a false pronunciation. The alphabetic method was unsuccessful with words the sounds of which did not correspond to the spelling. It failed with foreign children, as these had little basis in English speech to suggest right pronunciation and rectify wrong pronunciation. The weakness of this method became more apparent with the influx of immigrant children during the last half of last century, and the attention of teachers was turned to other and more efficient methods. In the American Colonial (*q.v.*) period the alphabetic method was about the only special method of teaching reading employed. The transition step of combining letters into syllables was provided between the learning of the alphabet and the reading of words. Together the " alphabetic " and " syllabic " methods constituted one of the first " synthetic " methods of teaching beginners to read. H. S.

See Reading, Teaching Beginners.

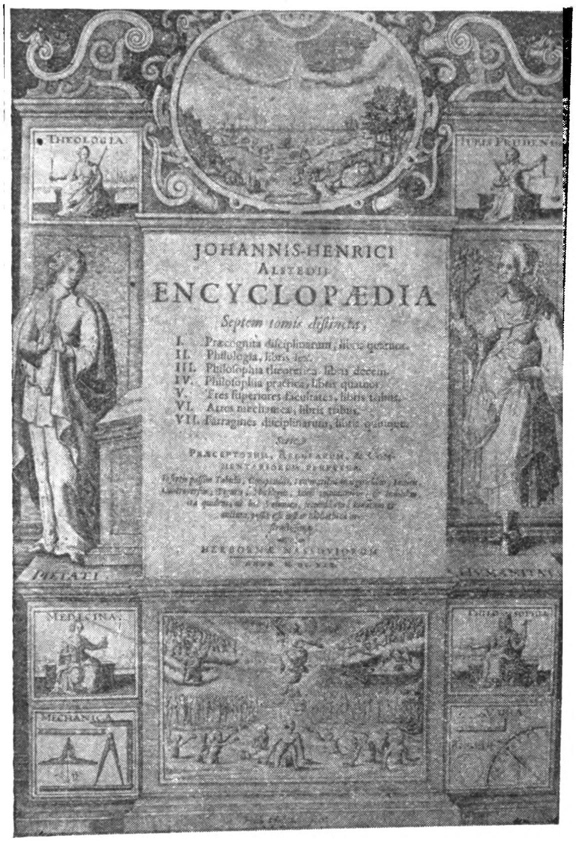
ALPHABETIC SPELLING. — See Spelling.

ALSACE-LORAINE, EDUCATION IN. — See German Empire, Education in.

ALSTED, JOHANN HEINRICH. — A theologian of the Reformed Church, the author of a vast body of theological, philosophical, and pedagogical works, and the master who in many directions exerted a profound influence upon the famous educator Comenius, was born in 1588 at Herborn in Nassau. His father, a minister and teacher, devoted himself to the education of the young Alsted until at the age of 14 he was enrolled on the books of the gymnasium or pädagogium of his native town. Graduating as an accomplished Latinist, well versed also in philosophy and theology, Alsted proceeded upon one of those academic journeys (*peregrinationes academicae*) that were at the time regarded as an indispensable supplement to the education of a cultured scholar. Before returning home he had listened to the distinguished teachers of the day at Marburg, Frankfort, Heidelberg, Strassburg, and Basle. Alsted now became a teacher in the high school at Herborn. His amazing literary activity soon rendered his name illustrious throughout Germany, and procured him the rank of extraordinary professor of philosophy (1610). The youth of all lands in which the Reformed religion had taken root flocked to hear him, and among others Comenius (1611), who owed to the youthful professor his first impulse toward didactic studies. In 1615 Alsted was made ordinary professor; and in 1618 one finds him among those summoned to the Dordrecht Synod, at which the orthodox Reformed theology was to win a signal victory over Arminianism. In 1619 Alsted was appointed professor of theology. At this time the storms of the Thirty Years' War devastated the land of Nassau, bringing plague and fire in their train. Knowing that the school at Herborn could never maintain itself in the face of these disasters, Alsted in 1629 reluctantly obeyed a call to the conduct of a new academy at Stuhl-

Weissenburg. Here he continued to produce book upon book, so that even his untimely death on November 9, 1638, did not prevent him from taking rank as one of the most prolific writers of any age.

Alsted was one of that noble-spirited band in whom the culture of antiquity, but recently made available by the scholars of the Renaissance, was happily united with the intense moral earnestness of the Reformation. Few had drunk more deeply at the springs of classical learning; few were more zealous in doctrinal disputation or more fervent in religious faith. Education was to Alsted a branch of the history of culture and a handmaid of divine truth. His universal encyclopedia, in two folio volumes, published at Herborn in 1630, the most famous work of his pen and an undertaking that has scarcely a parallel, includes a treatment of education which is not merely of interest as an illustration of the theory, but also the practice of German education in that day. It is obvious that the books upon education, at least, were written with genuine love for the work, and not in a perfunctory spirit. Alsted's Nassau writings include no less than 120 volumes, several of which run each to more than a thousand pages.



Consult *Johann Heinrich Alsted's pädagogisch-didaktische Reform-Bestrebungen, Lippert.*

P. R. C.

ALTDORF, THE UNIVERSITY OF. — Near Nuremberg, Bavaria; played a prominent rôle as a Protestant institution of learning during the seventeenth century. It owed its origin to a *Gymnasium* removed from Nuremberg to Altdorf in 1573, although the institution was not transformed into a university until 1622. Like so many of the other German universities established during the seventeenth century, it succumbed under the calamities that befell the German states during the period of the Napoleonic conquests, and closed its doors in 1807.

ALTENSTEIN, KARL FREIHERR VON STEIN ZUM (1770–1840). — The first Prussian Minister of Education. He was born in Ansbach, being a descendant of one of the oldest German families, studied law at the universities of Erlangen and Göttingen, and entered the Prussian administrative service, in which he rose very rapidly. After the resignation of Stein in 1808, he became minister of finances, and was practically at the head of the government until 1810. In this position he coöperated very effectively in the establishment of the University of Berlin. In 1817 he was called to the charge of the newly created Ministry of Education, which he directed until 1835, when he retired on account of old age.

Altenstein's administration was of great influence on the development of the Prussian school system. He established the University of Bonn, as well as many new gymnasiums, teachers' seminaries, and other educational institutions. He tried to enforce the principle of compulsory education and to raise the income of the elementary teachers. The project of a general school law worked out under his direction in 1819 did not pass, but its principles were embodied in later legislation.

ALTERNATION OF STUDIES. — It is usual in arranging the succession of lesson periods to alternate between subjects more or less formal and strainful and those to a considerable degree objective and restful. Thus music, drawing, physical education, manual training, or nature study might follow and be followed by arithmetic, history, grammar, etc. Such a succession, designed to relieve strain and fatigue through recreation or change, is spoken of as an "alternation of studies."

See PROGRAM; SCHEDULE.

ALTERNATING SYSTEM. — In an ungraded school with several divisions or groups it is necessary for the teacher to give his class instruction to the groups in alternation. Even in city schools, where only one grade is under the control of a single teacher, it is frequently required that the children of the single grade be divided into two groups, which are to have the major attention of the teacher alternately. When one group is reciting, the other studies.

Such a method of class management is called an " alternating system " of instruction.

See GRADING; CLASSIFICATION; PROGRAM.

ALTHAMMER, ANDREAS (1498–1564). — A German Lutheran pastor. He was born in Brentz, and became city pastor in Ausbach (1528). He is said to be the author of the first religious textbook which was known by the name of catechism. He published also notes and explanations to the *Germania* of Tacitus.

See CATECHISM.

ALTHOFF, FRIEDRICH (1839–1908). — For about twenty-five years one of the leading officials in the educational administration in Prussia. In 1880 he was appointed professor at Strassburg, and in 1882 he entered the Ministry of Education becoming connected with the department for universities and scientific institutions, where he was active for fifteen years. In 1897 he became the chief permanent official in the ministry. During his long official career he exercised a great influence over Prussian education. He took a broad view of education, and showed great interest in educational movements in England, France, and the United States. From Harvard University he received an honorary degree. To his suggestion and efforts are due the exchange of German and American professors, and the establishment of the important Inquiry Bureau (*Auskunftstelle*) of the Berlin University. He died on Oct. 20, 1908. I. L. K.

ALTRUISM AND EGOISM. — While these words, as antithetical psychological and moral terms, are comparatively novel in English thought (having been introduced by the followers of Comte, especially George Eliot, and by Herbert Spencer) the ideas underlying them constitute the most fundamental and enduring problem of English ethical speculation. British ethics, in contrast with Continental, has been dominantly individualistic in its basis and psychological in its method. Grotius, the founder of the Continental tradition, revived and developed the classic principle of Greek and Roman morals, that man is social by nature, and that this sociability, being a universal trait, is essentially rational in character. Hence the content of morals was arrived at deductively by developing the necessity of rational conditions of the manifestation of man's social nature.

Hobbes started English thought in an opposite direction. He held that the primary law of nature is individual self-preservation, and that men, instead of being by nature fit for society, are naturally averse to it, the only natural conditions of their coming together socially being accidental, namely, desire for comfort and profit, and vainglory or love of honor and fame attained by a competitive outstripping of others. Since, however, the natural tendencies of men to seek in purely individualistic ways their self-preservation bring them into conflict with one another, there results a condition of mutual fear and uncertainty, a condition wherein wealth, the sciences, and the arts are all impossible, and the life of man is " solitary, brutish, and nasty." From this untoward result of pure individualistic self-seeking, Hobbes deduces the necessity of a central authority; a political sovereign, which has the power to impose common laws upon men and to enforce peace and order. The edicts of civil authority are thus the source of justice and morality.

While Hobbes' doctrine called out a storm of protest from all quarters, while he had no avowed disciples, nevertheless he set the problem and fixed the method of subsequent British moral theorizing. The problem was reconciling the natural constitution of individual man with the demands of civilized social life. The method was that of psychological examination of the individual to ascertain what is his natural constitution. In the main Hobbes' successors contended that man's psychological structure contains two sets of motive springs, termed respectively self-love and benevolence (or self-interest and sympathy), and that the sympathetic spring to action, disinterested interest in the happiness of others, is as much a genuine part of the individual's natural constitution as is his passion for self-preservation.

By the latter part of the eighteenth century this type of moral philosophy was elaborated to a point where it became the psychological foundation for the economic theory of Adam Smith and the utilitarianism of Jeremy Bentham — the two most influential doctrines of the time. Adam Smith made sympathy the basis of ethics and intelligent self-interest the basis of economics, and bent his energies to proving that if intelligent self-love, or the reasonable desire for personal comfort and profit, were left free from arbitrary political regulations, it naturally brought men together in natural agreement (contracts) so that each man, in serving himself, served his fellow. In this way, under the guidance of the " invisible hand " of Providence, men in seeking their own interests promoted unconsciously the welfare of society as a whole even more efficaciously than if they had sought to do so from motives of conscious philanthropy.

Jeremy Bentham furnished the natural pendant to this doctrine. Without committing himself upon the psychological question of whether sympathy is as innate as self-love, he held that the sole moral criterion is the tendency of acts to promote universal happiness, so that benevolence is the ultimate virtue. He also held that men's need for the approval, esteem, and aid of others is so great that ultimately the dictates of universal benevolence and of intelligent self-love coincide. In promoting the happiness of all, the individual is taking the best means to secure his own greatest happiness, and vice versa. Thus Bentham's moral doctrine effectively supplemented the economic theory of Smith.

This result, completely reversing the original assumption of Hobbes, practically terminated the movement. Further discussion was coincident with the introduction of the terms "egoism" and "altruism" as substitutes for, although not synonymous with, the older terms. The nineteenth century, in its reaction against the isolated individualism of the eighteenth, laid great stress upon the importance of the traditions and institutions of society as absolutely necessary to the proper nurture of the individual. Egoism thus became a term standing in the main for the nonsocial tendencies in the individual, which needed to be transformed in order that the individual might take his due place in the social order, while altruism meant regard for the well-being of others which formed the social cement, and to which therefore egoism must be subordinated, moral discipline consisting essentially in acquiring habits of such subordination.

Spencer, however, saw in the notion of organic evolution a means of reassigning positive moral value to egoism while reconciling it to altruism. He distinguished "relative ethics" as the code appropriate to an imperfect state of evolution from absolute ethics, or the code obtaining when the goal of evolution, the complete adaptation of the individual to his environment, is attained. During the transition period, only a compromise between the claims of individual and general happiness is possible. When individuals are completely adapted, however, the acts necessary to the well-being of society will have become, through heredity, the spontaneous functions of the individual, and hence attended with pleasure.

The present tendency is to view the whole question as arising from a separation of the individual from social relations which has no basis in fact. The primary or natural impulses of man, just because they are natural, are neither egoistic nor altruistic, although some of them tend more to individual results and others to acts serviceable to others. Either tendency may be unduly cultivated, but normal moral growth consists in organizing the natural impulses so that the individual finds his chief interest in acts that at the same time are socially useful. The moral problem of education is thus not one of balancing or compromising two sets of motives, but of developing that type of ego or self which finds happiness in the kind of acts that are of social value. This result is achieved by enlightening the individual as to social ends, and by forming a disposition actively interested in such ends, rather than by conscious appeal to "altruistic" motives. The fallacy underlying the older controversy was the false antithesis of the "self" and the "other"; this antithesis is overcome by recognition of the objective social relations and activities which concern alike the "self" and the "other." To bring about this appreciation of social relations as a common good is the chief function of the school as a social institution.

J. D.

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ALUMNI ASSOCIATION. — See Alumnus; University and College Alumni Associations.

ALUMNUS. — Literally, *nursling, foster child.* A term which is the corollary of the use of Alma Mater (*q.v.*) with reference to a college or university, and which was at first applied to one who had been a student in such an institution. At present its use has become generalized in America, and applicable to a former pupil in any institution for higher education, including high schools. As opposed to graduate, the term emphasizes rather the personal attitude of affection and devotion to an institution. In 1840 an Alumni Association was formed at Harvard to include all who had taken their first degree at that university. At first only the social side was emphasized by such associations, but gradually a sphere of considerable usefulness was developed, not only in welding together men of one college, but in keeping them in close touch with it and maintaining their interest. A spirit of mutual help has sprung up among the members and has been extended to the young graduates. The influence of alumni associations was crystallized and given a new direction about forty years ago, when a movement began to obtain representation of alumni on boards of trustees of colleges and universities. Since 1866 the Board of Overseers at Harvard has consisted of 30 members elected by the alumni. In other universities the alumni have obtained representation on boards of trustees. This practice has become almost universal. As members of different professions and callings, these representatives can exercise their influence in preventing hasty action or conservatism, and introduce an element of democracy into university management. The representation of alumni on boards of trustees corresponds to the practice in the English universities of having representatives of Convocation on the Senate. The extension of alumni associations to high schools is a recent movement, and should certainly be an important medium for keeping schools and parents in close touch. In England school traditions and school friendships are maintained and fostered by Old Boys' Associations (*e.g.* Old Etonians, Old Paulines, etc.), which are being extended to elementary schools. Up to the present only the social side and a spirit of devotion to the old school have been emphasized, but there is no reason why they should not in the future develop into an important instrument as representatives of intelligent lay opinion in education.

So far as university administration is concerned, the alumni associations are represented in England by Convocation (*q.v.*). Otherwise, with the exception of university clubs in London, there are no organizations which perform the general function of the American associations.

I. L. K.

See COLLEGES, AMERICAN; UNIVERSITY AND COLLEGE ALUMNI ASSOCIATIONS.

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AMATEURISM. — The question of amateurism has engaged the attention for a number of years of educators responsible for the supervision of college athletics. So long as physical exercises and athletic games are practiced simply to gratify the natural desire of youth for physical activity and recreation, all the participants remain amateurs in the true sense of the word. But when contests are organized as public spectacles to which admission fees are charged, and prizes are awarded to the winners, the inevitable result is that some competitors are not content with the honor of winning, but seek to utilize their skill for financial gain. Such a situation was developed in American colleges during the period of rapid extension and specialization of athletics beginning in the decade 1880–1890. The necessity of adopting rules to distinguish amateurs and professional athletes became imperative when the inordinate desire to win led student athletic managers to offer financial inducements to secure expert athletes for college teams.

There is nothing objectionable about a professional athlete as such, for he can be a very good sportsman and command general admiration and enjoy the public esteem so long as he remains among the professionals, but there is no sympathy with the professional who masquerades as an amateur. The professional athlete is the natural result of commercialized athletics; he corresponds to the circus performer and the vaudeville actor who earn a livelihood by exhibiting unusual skill to entertain the public. The conducting of athletic spectacles for financial gain is not a legitimate function of educational institutions; therefore, professional athletes should be excluded from participation in college athletics.

According to the generally accepted law, an athlete ceases to be an amateur by: (1) Receiving compensation directly or indirectly for participation in athletic contests. (2) Competing with or against a professional. (3) Receiving money for teaching any form of physical exercise. (4) Entering a competition open to all comers.

The enforcement of the amateur law presents many difficulties, because unscrupulous men are willing to resort to all sorts of questionable practices to evade the letter of the law. The first clause is most difficult to enforce. There are many ways of gaining financial profit from sport without competing for cash prizes or selling valuable prizes won in competition. Scholarships, lucrative positions where the compensation is excessive for the services rendered, free board and room under the guise of training expenses, excessive allowance for traveling expenses, etc., are some of the methods used to compensate college athletes while assuming to maintain amateur standards. Playing baseball on summer nines is also responsible for many infractions of the amateur law by college athletes. Clauses two and four are rarely violated by college athletes, except in the matter of summer baseball. Clause three presents difficulties only in cases where impecunious college athletes undertake to teach physical training classes as an avocation to help defray their legitimate living expenses. The whole problem of maintaining amateur standards in college athletics could be solved by organizing athletics on an educational basis for the benefit of students and doing away with commercialized athletics. There is honest division of opinion on the question of enforcing this clause, and also in the matter of permitting college students to earn money by playing on hotel or other semiprofessional "summer nines." Some contend that any *bona fide* student who maintains a satisfactory standing in his studies and whose conduct is that becoming a gentleman should be permitted to earn money by his athletic skill. The argument advanced to support this proposition is, that playing baseball and teaching physical training are just as legitimate methods of earning money as tutoring, singing, or playing in an orchestra, activities to which no objection is made.

Those who favor the enforcement of the amateur law contend that professionalism in college athletics is the cause of many serious evils, and therefore amateur standards must be maintained. There is no objection to a student using his skill to earn money, but by so doing, he ceases to be an amateur and must forego the privilege of participating in college athletics.

The inordinate desire to win at any cost because winning insures financial success is largely responsible for the difficulties encountered in maintaining amateur standards. These difficulties will disappear when college athletics are organized on an educational basis, and the commercial interests are eliminated.

G. L. M.

See Athletics, Educational.

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AMBIDEXTERITY. — There are certain individuals who are able in all types of manipulation to use the right or left hand with equal freedom and skill; they are said to be ambidextrous or to be possessed of ambidexterity. The great majority of individuals are so developed that the finer manipulations are made freely and skillfully by one hand only, the other hand acting merely as a holder or support for the manipulating hand. When the finer manipulations are naturally made with the right hand, the person is called right-handed; when the finer manipulations are made naturally with the left hand, the person is said to be left-handed. There are varying degrees of right-handedness and left-handedness, some individuals showing very little ability to train the hand which does not naturally perform fine manipulations, others showing relatively little departure from ambidexterity.

The causes of these conditions are probably to be found in inherited nervous structures which in turn seem to be very closely related to inherited circulatory organs. The two sides of the brain receive their blood supply through arteries which are asymmetrical. Where the blood supply is larger to the left side of the brain, the right hand is naturally developed to a higher degree of dexterity; where the right side of the brain receives the greatest blood supply, the person is naturally left-handed. Exercise may have some effect in fixing this relation and exaggerating the degree of one-sided development, but the inherited structures are doubtless of the first importance.

The question of what kind of training to give left-handed children is involved by the general fact that all the conventions of life are adjusted on the assumption that right-handedness is not only more common, but more natural. All writing, for example, is adapted to right-handed manipulation. The best practical rule, therefore, would seem to be this: if a child is so little predisposed toward left-handedness that some effort will fit him to the common mode of action, it is better for him to be trained in right-handed movements. If, on the other hand, he is extremely left-handed, it is futile to attempt to change his inherited mode of activity. Ambidexterity is not a natural goal of development. One hand only is required for fine manipulation. The other finds its normal and adequate function in supporting the hand engaged in fine manipulations.

C. H. J.

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AMBROSE. — The greatest ecclesiastical statesman of the fourth century, born A.D. 340 at Trèves, where his father was governor. He was educated for the bar in Rome under the foremost rhetoricians, frequenting the Senate and the Forum, and soon surpassing his fellow-students in learning and accomplishments. At an early age he became governor of Northern Italy, and soon gained such a hold upon the people of Milan that they forced him to become their archbishop in 374. Milan was then the seat of the imperial government and needed an archbishop of sound practical wisdom and large executive ability, qualities which Ambrose possessed beyond any man of his time. Under the instruction of Simplicianus he soon became a sound theologian and a great teacher. He fostered sound learning in every way, establishing schools and founding monasteries which became centers of intellectual life, not only in Italy, but also in Ireland, for many centuries. His most famous pupil was St. Augustine, through whom he influenced the whole history of Latin theology. In common with the Fathers of the Latin Church, and unlike the Alexandrian teachers, he deprecated the study of Greek philosophy. He distributed his princely fortune amongst the poor, and became the chief champion of the people in their struggle for religious liberty and purity of faith. He contended stubbornly against the Arian, Manichæan, and Pelagian heresies, fearlessly opposing the emperors and leaders of the Church. He left his mark upon the Church chiefly in three ways — in the assertion of her spiritual authority (thus laying the foundation for the growth of the Papacy in succeeding centuries), in church music, and in liturgics. He may be regarded as the father of music in the Western Church. This had previously consisted of a monotonous recitation of the psalms and prayers. St. Ambrose introduced measured time, regular rhythm, and varied melody, following the musical system of the Greeks and using antiphonal effects. A contemporary account of the origin and character of this music is given by St. Augustine in his *Confessions* (IX, 7 and X, 33). The reform spread rapidly until the use of the Ambrosian Chant became almost universal in the Western Church. Later on this was developed into the Gregorian Chant, which resounded through the great cathedrals and abbeys of Europe for a thousand years. St. Ambrose also introduced the practice of singing hymns in divine service, and wrote many beautiful Latin hymns, of which the *Te Deum Laudamus* is the best known. He devoted much attention to liturgics, and gave the Liturgy of Milan a distinctive form, different from that of Rome and more like those of the East, which is known as the Ambrosian Liturgy and has been tenaciously retained in the Province of Milan down to the present day. St. Ambrose has left a rich legacy of theological treatises, sermons, exegetical, moral, and ascetical works, which are full of striking practical thoughts. W. R.

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AMERICAN ACADEMY OF ARTS AND SCIENCES. — Organized in Boston in 1780. John Adams, afterwards President of the United States, was originally its chief promoter. Its purpose was "to promote and encourage the knowledge of the natural history of the country, and to determine the uses to which the various natural productions of the country may be applied; to promote and encourage medical discourses, mathematical disquisitions, philosophical inquiries and experiments; astronomical, meteorological and geographical observations, and improvements in agriculture, arts, manufactures, and commerce, and, in fine, to cultivate every art and science which may tend to advance the interest, dignity, honour, and happiness of a free, independent, and virtuous people." It followed in the main the lines of scientific activity adopted by the American Philosophical Society (*q.v.*). It published for many years scientific memoirs as well as its proceedings. It has a scientific library of upwards of 25,000 volumes. W. S. M.

AMERICAN ANNALS OF EDUCATION. — See Educational Journalism in America.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF EDUCATION.— (1849-1855.) An association which met in pursuance of a call from "the friends of the common schools of the United States" at Philadelphia, the 17th, 18th, and 19th of October, 1849. The call was signed by most of the educational leaders of the middle of the last century, including 12 state superintendents of schools and 25 other representative schoolmen. The purpose of the organization, as stated in the preliminary call, was "that the great cause of popular education in the United States may be advanced and the exertions of its friends strengthened and systematized by mutual consultation and deliberation." Horace Mann (*q.v.*) (1796-1859), then secretary of the state board of education in Massachusetts, was the president of the first meeting. Eight annual meetings were held, at which a wide range of subjects was presented in the form of discussions, addresses, and essays. At the first meeting, for example, the list included school organization and supervision, normal schools and teachers' institutes, moral and religious instruction, school architecture, the grading system, the teaching of phonetics, and school funds. The speakers at this meeting included Henry Barnard (1811-1900), John Griscom (1774-1852), Joseph Henry (1797-1878), John S. Hart (1810-1877), Alonzo Potter (1800-1865), Gideon F. Thayer (1793-1863), Nathan Bishop (1777-1855), and John Kingsbury (1801-1874). (See articles on these.) The proceedings of the first meeting were printed in a pamphlet of 40 pages. The second meeting of the association was also held in Philadelphia (1850), with Eliphalet Nott (1773-1866), president of Union College, as presiding officer.

The last meeting was held at Detroit on Aug. 12-15, 1856. It was planned to hold the next session in New York, but the organization of the National Teachers' Association (*q.v.*) superseded the American Association for the Advancement of Education, and a ninth meeting was not held. W. S. M.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. — Organized in 1840, as an outgrowth of the American Philosophical Society (*q.v.*), which Benjamin Franklin had founded in 1743, and of the American Geological Association. Its object is "by periodical and migratory meetings to promote intercourse between those who are cultivating sciences in different parts of America, to give a stronger and more general impulse and more systematic direction to scientific research, and to procure for the labours of scientific men increased facilities and wider usefulness." Its first meeting was held in Philadelphia, and the subsequent meetings of the association have been held in the leading cities of the country. Its presidents have included most of the first American men of science, — William B. Rogers, W. C. Redfield, Joseph Henry, Alexander Dallas Bache, Louis Agassiz, Benjamin Peirce, James D. Dana, F. A. P. Barnard, Asa Gray, J. W. Powell, Daniel G. Brinton, E. D. Cope, and Lewis H. Morgan. The chief executive officer is the permanent secretary, L. O. Howard, Washington, D. C., being the present incumbent. The association is composed of members and fellows. All persons interested in science are eligible to membership, while fellows are elected from such members as are engaged in advancing science. The association has sections in mathematics and astronomy, physics, chemistry, mechanical science and engineering, geology and geography, zoölogy, botany, anthropology and psychology, social and economic science, physiology and experimental medicine, and education. W. S. M.

AMERICAN COLLEGE AND EDUCATION SOCIETY. — See AMERICAN EDUCATION SOCIETY; COLLEGE BOARDS IN EDUCATION, DENOMINATIONAL.

AMERICAN EDUCATION SOCIETY. — Organized in 1815 for the purpose of aid in the education of Protestant clergymen. Its original name was the American Society for the Education of Pious Youth for the Gospel Ministry, but the title was changed in 1820 to the American Education Society. It held annual conventions and made appropriations to the different colleges for the payment of the tuition of young men looking to the ministry. It also took a keen interest in the subject of religious education in general. W. S. M.

AMERICAN INSTITUTE OF INSTRUCTION. — The oldest educational association in the United States, organized in 1830. With two exceptions —1893, on account of the International Congress of Education at Chicago, and 1903, when the National Education Association met in Boston — annual meetings have been held. The Institute was organized by "teachers and friends of education" at Boston the 15th of March, 1830, and a temporary committee was selected to provide for a program for a general meeting to be held in August that year. The first regular meeting, held at Boston the 19th, 20th, 21st, and 22d of August, 1830, was attended by 300 delegates, who represented the educational interests of 11 states. A constitution was adopted which recited as the object of the new organization "the diffusion of useful knowledge in regard to education." At each meeting problems of vital interest were proposed for general discussion, and set addresses were provided by the executive committee. The annual sessions varied from four to six days, with morning, afternoon, and evening sessions. The original constitution provided that the conventions should meet annually in Boston, but this article was subsequently altered, and the executive committee was given power to call meetings at such places as they deemed best. While not intended solely for New England, the membership of the Institute has always been almost entirely represented by Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, and Maine, and for the first 50 years of its existence 49 of the meetings were held in New England. Since 1880 4 meetings have been held in New York state and 3 in Canada. The Institute took a leading part in most of the great educational movements of the country during the formative period of the state school systems — such as normal schools, the enlargement and the enrichment of the course of study, provision for better textbooks, school supervision, and the study of science. Its proceedings, which were published from the first, include not only the names of practically all the educational leaders of the nineteenth century, but such well-known names in public life as Lyman Beecher, Joseph Story, Caleb Cushing, Ralph Waldo Emerson, A. Bronson Alcott, William E. Channing. Theodore Parker, George Ticknor, Henry Ward Beecher, Julia Ward Howe, and Kaspar Spurzheim. The list of educators includes every name that belongs to the history of American education during the past century, — Horace Mann, Henry Barnard, Samuel G. Howe, Lowell Mason, William C. Woodbridge, Walter R. Johnson, William Russell, James G. Carter, William A. Alcott, Elizabeth P. Peabody, Francis Wayland, John D. Philbrick, Warren Colburn, William T. Harris, Charles Brooks, Francis W. Parker, Samuel J. May, Nicholas Tillinghast, to name at random but a few. (See articles on these). Some of the most important contributions to the literature of American education were given originally as lectures at the American Institute of Instruction, as A. Bronson Alcott's *Means of Early Education* (1832), Samuel R. Hall's *Qualification of Teachers* (1833), Sarah Austin's *Prussian System of Schools* (1835), Lowell Mason's *Pestalozzian Method of Teaching Music* (1834), Samuel G. Howe's *Education of the Blind* (1836), Charles Brook's *Teachers' Seminaries* (1837), David P. Page's *Means and Methods of Instruction* (1843), Horace Mann's *Motives of Teachers* (1847), Henry Barnard's *Teachers' Institutes* (1849), and Cyrus Pierce's *Crime — its Causes and Cure* (1853). Albert E. Winship, in a historical sketch of the Institute (see *Proc. N.E.A.* for 1906), calls attention to the fact that in the American Institute of Instruction were born Greenleaf's arithmetics, Greene's grammars, Hilliard's readers, Mason's music series, Newman's rhetoric, Wayland's philosophies, and Harkness' Latin series.

W. S. M.

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AMERICAN INTERNATIONAL COLLEGE, SPRINGFIELD, MASS. — Founded in 1885 as the French Protestant College; title changed in 1890 to French-American College and in 1905 to the present title. The institution aims to provide a higher Christian education to foreign immigrant youth of both sexes. A four-year academy course is maintained, preparing for the college. Pupils are admitted into the college at the age of 15. Two degrees, one in the classical, and one in the literary course, are offered. Industrial training is given by which students may pay their way. There is a faculty of 12 professors and instructors. Rev. Samuel H. Lee, M.A., is the president.

AMERICAN JOURNAL OF EDUCATION. — See EDUCATIONAL JOURNALISM IN AMERICA.

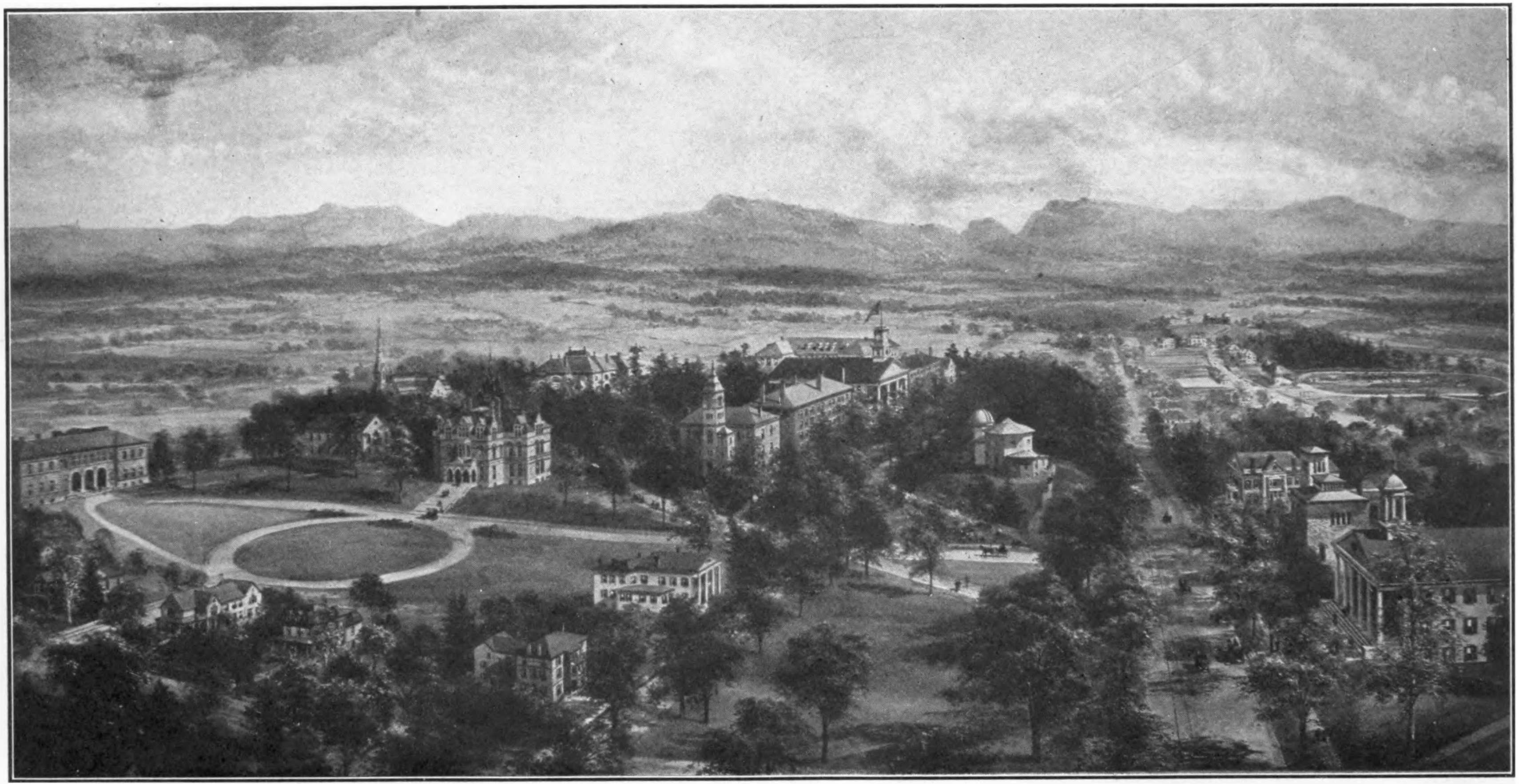
AMERICAN LIBRARY ASSOCIATION. — An organization which represents the interests of public and private, state and city, and institutional and association library interests in the United States, started at Philadelphia in 1876. Excepting 1878 and 1880, it has held annual meetings. Besides the general meetings, it has five sections, as follows: colleges and reference section, catalogue section, library work with children, state library commission section, and trustees' section. The permanent headquarters of the association are at No. 1 Washington Street, Chicago. The *American Library Journal* has been its chief organ. It has been active in the organization of state and local library associations, the organization of training schools for librarians, traveling libraries, and most of the leading topics affecting library science.

W. S. M.

AMERICAN LYCEUM ASSOCIATION (1831–1839).— An educational body which is, after the American Institute of Instruction, the oldest organization of its kind in the United States. This association grew out of the lyceum movement which had been started by Josiah Holbrook (1788–1854) at Millbury, Mass., in 1826, and spread rapidly over Massachusetts and Connecticut. Holbrook, as early as 1819, organized the first industrial school in the United States after the pattern of Fellenberg's (*q.v.*) institution at Hofwyl. The purpose of the lyceums which he organized in the different towns was (1) the improvement of the common schools, (2) the formation of lecture courses and the establishment of classes for the education of adults, and (3) the organization of libraries and museums. The Worcester (Mass.) County Lyceum Association was formed in 1827, and a state association in Massachusetts three years later. By 1831 there were 900 towns in the United States with lyceum associations, and 56 county associations. The national association was projected at the state convention held at Boston in 1830. It was, however, at a meeting of the New York State Lyceum Association, held at Albany the 13th of January, 1831, that it was formally organized and the program formulated. The purpose of the American Lyceum Association, as set forth in its constitution, was (1) to secure better legislative provisions for schools; (2) to improve the qualifications of teachers; (3) to secure closer relationship between the common schools and the colleges; (4) to improve methods of instruction and school discipline; (5) to introduce the natural sciences into the course of study; (6) to provide schools with books, apparatus, and teaching appliances; and (7) to arouse an interest in the education of girls and women. The first national meeting was held in New York City the 4th of May, 1831. Seven states were represented. The president of the meeting was Stephen Van Rensselaer (1765–1839). The principal topics of discussion at the first meeting were the extent to which the natural sciences may be taught in the common schools, the study of the Bible in the schools, the qualifications of teachers, and the need of seminaries for the education of teachers. In addition to the general topics, which were discussed by all the members of the convention, at the subsequent meetings of the association prepared addresses and essays were presented. The second annual meeting of the association was held in New York City the 4th of May, 1832. John Griscom (*q.v.*) was the president of the meeting. The operations of the various local lyceums was the general topic of the meeting, with essays and addresses on school discipline by President Griscom, the study of the constitution and political institutions by Theodore Frelinghuysen (1787–1861), appropriate use of the Bible in common education by Thomas S. Grimke, the extent to which the monitorial system is practicable in common school education by Walter Rogers Johnson (1794–1852), and the introduction of the natural sciences in the common schools by Chester Dewey (1784–1867). At the third annual meeting of the association, held in New York City, May, 1833, at which President W. A. Duer of Columbia College presided, the leading topics of discussion were manual labor schools, cabinets of natural history, and the study of physiology. As textbooks in the latter subject were wanting, the association decided to offer a prize of $300 for the best manuscript of a textbook on physiology for use in the schools, the same to be published by the association. The selection of the manuscript was left to a committee of four, "one from each of the professions of medicine, law, theology, and education." The desirability of "the establishment of a central school for teachers" and the appropriateness of the monitorial system for our common schools were the two topics for general discussion. The first six meetings of the American Lyceum Association were held in New York City. President Duer of Columbia College presided at the third, fourth, fifth, and sixth annual conventions. The seventh convention was held in Philadelphia, G. W. Ridgley presiding, with state aid for education, the monitorial system, and female education as the general topics, and essays and addresses on the education of the deaf, stammering, the study of meteorology, of elocution, and the question method in teaching. The eighth annual meeting was held at Hartford, May, 1838, with Thomas H. Gallaudet as presiding officer. The ninth and last meeting of the association was again held in New York City May 3-6, 1839, with President Duer of Columbia again as presiding officer. The chief topic at this meeting was the need of improvement of the common schools, with Charles Brooks as the leading speaker. Mr. Brooks asked the association to appoint a committee of five to organize a special convention to be held in Philadelphia during November for the consideration of the following topics: (1) to gather educational statistics; (2) to ascertain what has been accomplished in different parts of the country; (3) to discuss systems now in operation in Europe and see how far they may be applied in the United States; (4) to inquire into the value of normal schools; (5) to ascertain how and where may be procured the best school apparatus, reading books, libraries, and models of schoolhouses; (6) to petition Congress to insert a new item in taking the next census, viz.: to see how many children there are in each state between the ages of 7 and 16 who have received no elementary instruction. These topics, he urged, would elicit a mass of information which might be used as a basis for introducing legislation. The recommendation was adopted, and it was decided to ask the governor of each state to issue an appeal to the friends of education to attend the proposed convention. The meeting was held at Philadelphia the 22d of November, 1839. John Griscom presided. It was attended by 55 delegates from the different states, and the leading participants were Charles Brooks, Theodore Frelinghuysen, Henry R. Schoolcraft, Theodore Dwight, Jr., Alexander Dallas Bache, and E. C. Wines. The meeting by common consent urged the formation of state boards of education and the selection of secretaries of the same to serve as state superintendents of schools. It is doubtless true that the convention was fruitful in accelerating the unification of state school systems and of emphasizing the need of the service of professional schoolmen in the direction of the same. Although it was voted to hold another convention the following year in Washington, and five special committees were appointed, — one to arrange the national convention, one to memorialize the legislatures of the several states, one to memorialize Congress respecting the appropriation of the proceeds of the sale of the public lands, one to issue an appeal to the people with respect to needed improvements in the common schools, and one to memorialize Congress with reference to the Smithsonian legacy, — there is no record of a convention having been held in 1840. The proceedings of the association — to except the first, which was printed as a separate volume — appeared in the *American Annals of Education* and the *American Monthly Magazine*. W. S. M.

AMERICAN PHILOSOPHICAL SOCIETY. — The oldest scientific society in America, and still in existence, was organized in Philadelphia in 1743. Benjamin Franklin, its first secretary and for many years before his death its president, was instrumental in the organization of the society. Its labors were manifold, as is indicated by the following statement of its purpose and scope: "To ascertain new-discovered plants, herbs, trees, roots, their virtues, uses, etc.; methods of propagating them and making such as are useful but particular to some plantations more general; improvement of vegetable juices, ciders, wines, etc.; new methods of curing and preventing diseases; all new-discovered fossils in different countries, as mines, minerals, and quarries; new and useful improvements in any branch of mathematics; new discoveries in chemistry, such as distillation, brewing, and assaying ores; new mechanical inventions for saving labour, such as mills and carriages, and for raising and conveying water, draining meadows, etc.; all new arts, trades, and manufactures that may be proposed or thought of; surveys, maps, and charts of particular parts of the seacoast and of inland countries; courses and junctions of rivers and great roads, and situation of lakes and mountains; nature of soil and its productions; new methods of improving breeds of useful animals, and introducing other sorts from foreign countries; new improvements in planting, gardening, and clearing land, and all philosophical (scientific) experiments that let light into the nature of things, tend to increase the power of man over matter, and multiply the conveniences and the pleasures of life." It was the parent of the American Association for the Advancement of Science (*q.v.*) and of the numerous special scientific associations in America. From 1799 to 1838 it published its "transactions," and since that date its "proceedings." Its headquarters are at Philadelphia, and since the organization of the American Association for the Advancement of Science (*q.v.*) it has served the purpose of a local scientific association for Philadelphia. W. S. M.

AMERICAN SCHOOL SOCIETY. — Organized in 1832. Its purpose was the employment of professional agents who should examine the schools in the endeavor to improve them, and to organize schools in villages where none existed. During the first year of its existence its six agents visited 150 schools in Massachusetts, Vermont, New Hampshire, Maine, Connecticut, and New York. Its first annual convention was held at Andover, Mass., the 5th of August, 1833. Samuel Farrar presided, and Milo P. Jewitt was the secretary, and conventions were held the two following years. Samuel R. Hall was the moving spirit in the society. Besides the reports of the agents, the annual conventions gave considerable attention to problems of illiteracy in the American states and to the



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AMHERST COLLEGE.

inadequacy of textbooks for use in elementary schools. Among these, besides Samuel R. Hall, who took an active part in the annual meetings of the society, were Francis Wayland, Jacob Abbot, William C. Woodbridge, Josiah Holbrook, William A. Alcott, Rufus Choate, and Thomas H. Gallaudet (*qq.v.*). The work of the society was subsequently taken over by the American Lyceum Association (*q.v.*). W. S. M.

AMHERST COLLEGE, AMHERST, MASS. — An institution which took its origin from Amherst Academy, founded in 1814, one of the largest of the early New England schools. On Nov. 8, 1817, the trustees of this academy, adopting the suggestion of Rufus Graves, one of their number, voted to establish a " charity fund " for the training of indigent candidates for the ministry. Upon the failure of the original plan, which involved only the appointment of a professor, Rufus Graves circulated a proposal for a fund of $50,000 to be used in the establishment of a "Charity Institution." On May 8, 1821, the Rev. Zephaniah Swift Moore was elected president. His inauguration occurred on the day the college was opened (Sept. 21, 1821). The institution announced its intention of maintaining standards equal to those of Yale. Forty-seven students were matriculated, 15 of whom entered from Williams College. In 1822 there were, besides the president, 2 professors and a tutor. The president was the only teacher of the senior class. Nearly all the students were poor, and the cost of a year's schooling was about $200. The early years were periods of struggle so keen that, when President Moore died from overwork in 1823, the despairing seniors asked permission to graduate from some other institution. Not until the second year of the administration of President Heman Humphrey (inaugurated Oct. 15, 1823) did the college secure a charter. This was granted by the General Court on Feb. 21, 1825, in the face of an opposition led by those who felt that Williams College should be the only college in western Massachusetts. From 1825 to 1836 Amherst grew rapidly; for two years the institution had more students than Harvard or any other American college except Yale. But this growth was accompanied by increasing poverty. After several years of suspense, a petition for state aid was denied by the General Court in 1832. Immediately graduates and friends of Amherst by heroic efforts raised $30,000, all of it subscribed before the end of the year. In 1837 the enrollment was 259, but by 1846 it had decreased to less than half that number. The partial decline of religious enthusiasm injured the college, as did likewise the anti-slavery agitation. There was also a growing spirit of dissatisfaction among the undergraduates, which began in 1837 when the students asked that the system of honorary appointments be changed. Fostered by the newspapers, the impression became current that the college was mismanaged. Financial impotence contributed to difficulties which were not removed until the resignation of President Humphrey in 1842. His successor was the Rev. Edward Hitchcock, professor of theology and geology, and one of the greatest of American geologists. The tact and sagacity of President Hitchcock brought Amherst College from threatened bankruptcy to a safe and permanent prosperity. At the beginning of his administration, the plan was seriously considered of continuing the college in its original form of preparatory school, and certain influential undergraduates remained in college only by the personal persuasion of the president. At its close (1847) the college had received $25,000 of aid from the state, professorships had been endowed with $62,000, the Sears Fund of $12,000 was established, and a scientific course had been organized. Twenty years before, Amherst had been a pioneer in introducing a " parallel course " in which the ancient languages of the old curriculum were replaced by the modern, emphasis was laid upon the sciences, modern history, civil and political law, and a nontechnical study was made of engineering problems. Like this earlier experiment, the scientific course of President Hitchcock lasted only a few years. The fourth president was the Rev. William Augustus Stearns, Harvard '27, installed Nov. 22, 1854, who, in the words of Professor W. S. Tyler, " found the college brick, and left it granite." Seven buildings were erected or partly rebuilt during his administration; the curriculum was broadened, and many scholarships were established. During the Civil War, Amherst enlisted 247 students in the Union army, of whom 78 were undergraduates. The fiftieth anniversary was celebrated at the Commencement of 1871 when nearly 700 alumni were present. Upon the sudden death of President Stearns (June 8, 1876), the trustees elected as his successor the Rev. Julius Seelye, professor of philosophy, and at the time a member of Congress. The force of President Seelye's character, and the extent of his reputation as a scholar and educator, did much to place Amherst among the best American colleges. He introduced the system of self-government, anticipated many years before, which developed into one of the best features of Amherst life. The sixth president was Merrill Edwards Gates, who held office from 1890 to 1899. He was succeeded by the Rev. George Harris, '83.

The college is controlled by a Board of Trustees of 17 members, of whom 10 are laymen and 7 are clergymen. Twelve trustees are elected for life by the board, and 5 are chosen by the alumni, to serve 5 years. Amherst College was one of the institutions originally accepted by the Carnegie Foundation for the Advancement of Teaching (*q.v.*).

Degrees conferred are A.B., B.S., and M.A. for one year's graduate study in residence. The college is a member of the New England Association of Colleges and Preparatory Schools (*q.v.*).

From the outset, it has been the policy of Amherst to do the work of a "small college" of the best type. The fraternities, which elect nearly the entire student body, have proved instruments of value in training the younger students. The societies include: Alpha Delta Phi, Psi Upsilon, Delta Kappa Epsilon, Delta Upsilon, Chi Psi, Chi Phi, Beta Theta Pi, Theta Delta Chi, Phi Delta Theta, Phi Gamma Delta, and Phi Kappa Psi. All of them occupy houses. The library has 80,000 volumes. The scientific museums are unusually complete. Grounds, buildings, and equipment are valued at $646,500; real estate other than dormitories, etc., at $13,700. The total productive endowment is $1,965,284.15; the total annual income is $139,856.84, of which $41,208.16 is from tuition and other fees from students. The average salary of a professor is $2868. The instructing staff (1909) numbers 53, of whom 21 are full professors. There are 528 students. More than half of the 4200 graduates have become clergymen or teachers. C. G.

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AMITY COLLEGE, COLLEGE SPRINGS, IOWA. — A coeducational institution founded in 1855 by the Western Industrial and Scientific Association. Candidates are admitted on presenting a certificate from an academy or high school and making up necessary deficiencies, or by examination for which the requirements are equivalent approximately to three years' high school work. A preparatory school is attached to the college. Classical, scientific, philosophical, normal, business, and fine arts courses are offered. Degrees are conferred in the college and normal studies. Very few of the students take the college course. There is a faculty of 11 professors and instructors. Ross Turner Campbell, D.D., is the president.

AMMAN, JOHANN KONRAD (1669-1730). — A Swiss physician and teacher of deaf mutes. Born in Schaffhausen, he studied medicine in Basel, and went in 1690 to Amsterdam, where he soon became famous as a teacher of the deaf and dumb. His system was based on the pupil's observation of the lips and tongue of the teacher and the imitation of the motions seen. He also made the pupil grasp the throat of the teacher and feel the vibrations resulting in sound production. This "articulation method," which he explained in his books *Surdus loquens* (*The Deaf Speaking*) (Amsterdam, 1692), and *Dissertatio de loquela* (*Dissertation on Speech*) (Amsterdam, 1700), was afterwards adopted and improved by Heinicke, the founder of the first German institution for the instruction of deaf mutes. F. M.

AMNESIA. — Literally a loss or lack of memory; the term is used to designate the inability to recall one or more sets of events in the life of the individual. Amnesia is a common symptom in many types of mental disease, but may occur independently, and, in some people, be consistent with an otherwise perfectly normal condition of mind.

It is well known that there are well-marked normal individual differences in the learning and in the recall of certain classes of facts. One person may be able to remember and to recall the names of people whom he has met, another may be unable to recall the names, but may be able to recall their appearances. These differences in memory ability may be spoken of as amnesias, but, as will be shown later, they are not usually designated in this way.

Without reference to books or to notes, the stock broker is able to quote the various prices of a fluctuating stock over a period of a year or more, the butcher can give the wholesale and retail prices of meat and poultry for the same period, and the musician can recall the notation and the fingering of many compositions, but each of these individuals is usually unable to recall in such detail as are the others the facts in lines of endeavor different to that in which he may be employed. The inability of the stock broker to recall the theme of an opera, or that of the musician to recall the fluctuating prices of stock that he has bought may be called amnesia, but it must be noted that there is not so great an interest in these events and not so much importance that the facts be so well retained. On the other hand, we see that the facts that are so well retained are special vocational facts, and it is usual to consider them the abnormal part of memory rather than the normal. In this case the unusual memory is due to close attention, and these special memories may be properly called *hypermnesias* (*q.v.*, and also article on *Memory*).

If there be an inability to recall facts to which the individual pays attention and which it is important for him to remember, we say there is an amnesia. This condition may be permanent or temporary, complete or incomplete, circumscribed or progressive, and may be due to organic nerve disease or to simple functional alterations.

Many classifications of the amnesias have been made, but that proposed and used by Janet, which will be followed here, is most satisfactory and most complete.

(1) *Systematized* amnesias. The best example of a systematized amnesia is that of an aphasic (see APHASIA). In such a case we find

a loss of a definite category or collection of memories, it may be of sounds, or of movements, or of sights, or of other sensory memories or combinations of them, and the associations which were formerly produced by, let us say, a tone or a light are no longer produced. Such a systematized loss is to be found in astasia-abasia (*q.v.*), in which condition the inability to stand or to walk is not due to any lack of muscular power or to deficient control of individual muscles, but solely to the inability to coördinate the motor impulses. The skin and other sensations accompanying movements are retained in this state, and there is also present the ability to judge movements except in the standing position. There is a motor amnesia, or a loss of the motor images.

(2) *Localized* amnesias are memory losses of events occurring during a certain period. This condition is usually found to be due to the shock of an accident or to some other strongly emotional event. If only one event is forgotten, the amnesia is called *simple*. If the forgotten events are those preceding the accident, the amnesia is called *retrograde;* if those following the accident or shock, the amnesia is called *anterograde*.

(3) A *general* amnesia may also be produced by shock. In such a case the individual seems, as Janet so well expressed it, " to be born again and to learn anew all that he had previously learned from infancy."

(4) *Continued* amnesia. In some there is found a retention and an ability to recall old occurrences, but an inability to recall events of recent date and a difficulty or an inability to acquire new facts and to retain them. This is the kind of amnesia usually found in the aged, but it may occur in those in middle life.

Each of these kinds of amnesia may be (*a*) *complete* — everything is lost, and there is no power to recall; (*b*) *incomplete* — some memories persist and others can be recalled, if sufficient effort is made; (*c*) *sharp*, or circumscribed in time, or (*d*) *progressive* — at first incomplete, then increasing little by little until there is a complete amnesia. S. I. F.

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AMOROS, FRANCIS (1769–1848). — One of the pioneers of the physical education movement in France; was born in Valencia (Spain). At the age of 18, he entered the Spanish army, and gradually rose to the rank of colonel. Afterwards he filled various high administrative positions, and, in 1807, he was entrusted with the education of the young prince Don Francisco de Paula, which he directed according to Pestalozzi's principles. During the Napoleonic invasion of Spain, he joined the French party and was employed by King Joseph as governor of several Spanish provinces. In 1814, he was forced to flee from Spain and found a refuge in France. In 1831, he was appointed director of the Military Gymnasium of Paris. His chief work is his *Manuel d'éducation physique, gymnastique et morale,* published in 1838.

AMSTERDAM, UNIVERSITY OF. — Founded in 1877 by the Municipal Council, which has a large share in the control and in the election of professors under the supervision of the Ministry of Education. The fact of municipal control distinguishes it from the state universities of Holland. The history of the institution, however, goes back to 1632, from which date it maintained a continuous existence as the *Athenæum Illustre.* Faculties of theology, law, medicine, arts, and the sciences are maintained. There were enrolled in 1908–1909, 925 students and 117 auditors. This institution is to be distinguished from the Free University of Amsterdam, which was founded in 1880 by the Association for Reformed Education under the control of five directors. Faculties of law, theology, literature, and medicine are maintained. There was in 1909 an enrollment of about 170 students.

See Netherlands, Education in.

AMUSIA. — An association disorder consisting in an inability to appreciate music as such, *i.e.* as a mode of expression corresponding to speech. It is a special kind of aphasia (*q.v.*) of rare occurrence.

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ANÆMIA. — See Diseases, School.

ANAGNOS, MICHEL (1837–1906). — Successor of Samuel G. Howe as the American leader of the education of the blind, was born at Epirus, Greece, the 7th of November, 1837, and received his education in the state schools of Greece and at the University of Athens. He came to America in 1867, and became associate director of the Perkins Institution of the Blind. Upon the death of Dr. Howe in 1876 he became director of the institution, which position he held for 30 years. He secured the first permanent fund for the printing of books in raised letters for the blind, made the kindergarten a feature of the schools for the blind, and inaugurated other progressive movements. Besides his 30 annual reports, which cover the entire field of the pedagogy of the blind, he was the author of *Education of the Blind, Kindergartens and Primary Schools for the Blind, Through Education to Independence*, and of several juvenile books in raised letters for the blind. He died at Turn Severin, Roumania, the 29th of June, 1906. W. S. M.

ANALGESIA. — The absence of the sense of pain, or the inability to appreciate pain. The word is (1) most correctly used to indicate that condition in which painful stimuli from without the body are not appreciated as such; (2) sometimes, but incorrectly, used for hypalgesia (*q.v.*) to indicate a lessened pain appreciation. The causes and forms of analgesia are discussed in the article on anæsthesia (*q.v.*). S. I. F.

ANALOGY. — Psychology of. There is a strong tendency for individuals to carry over to any new situation which may arise the habits of thought and action which have been cultivated in other situations somewhat similar. Thus, if one has acquired a certain distaste for a person, he is likely to carry over the same general attitude of dislike to any new acquaintance who resembles in features or behavior the person for whom he first acquired the dislike. Children exhibit the tendency to form plurals of such irregular nouns as man and sheep, after the fashion of regular nouns ending in *s*. The tendency to reason by analogy is very marked, especially in the case of uncritical individuals at a relatively low stage of intellectual development. All savages explain the phenomena of nature after the analogy of their own personal experiences. They come, therefore, to personify all the processes and objects about them.

An elaborate system of argument by analogy appears in the pseudo-science of astrology. The astrologers, finding that a certain group of events in the world occurred at the time of a certain juxtaposition of the heavenly bodies, looked forward to the recurrence of a similar group of events in the world whenever the same relative positions of heavenly bodies occurred. As knowledge developed, the tendency to argument by analogy became restricted through the exercise of the critical faculty. Two events were compared with each other only when their characteristics could be shown by careful study to have a fundamental resemblance. Thus, the pseudo-science of astrology broke down as soon as it appeared that the laws of human behavior are in no way connected with the position of the heavenly bodies. The child's tendency to form all plurals as if they were regular, disappears as soon as he comes to recognize the complexity of his language and the variety of its forms. A certain number of analogies continue to be justifiable even in later science, but these analogies must be sifted, and in all cases where they are accepted, justified by a full statement of their conditions. In the development of children the transition from argument by mere analogy to the critical formation of scientific judgment is a definite mark of intellectual development. Analogy may therefore be regarded as a first and simple form of reasoning, to be superseded later by critical analysis and comparison. See ANALYSIS AND SYNTHESIS. C. H. J.

Logic of. — In its origin analogy was a mathematical term, meaning an equivalence of ratio, *i.e.* a proportion. Thence it was a natural extension to give the word a logical sense, meaning similarity of relations. When Darwin carried over the Malthusian principle of the multiplication of population in human society in excess of the means of subsistence to animal and vegetable life generally, he reasoned by analogy. Although the things were different, he assumed a similarity of relation in the two cases. Analogy is also frequently used in a loose and vague logical sense, meaning any similarity employed as a factor in reasoning. In many cases, relations and qualities can hardly be distinguished from each other, so that similarity of quality becomes a basis of inference. In this usage, analogy runs into association by similarity (*q.v.*). That association by similarity is of higher intellectual importance than that by contiguity has long been noticed, so that some writers have gone to the extreme of identifying reasoning itself with association by similarity. While this view is extreme, there can be no doubt that analogy is always present (either of relations or qualities) as an influential factor in inference. Its value for purposes of proof, however, is not to be identified with its value for discovery. Indispensable for the latter, it is of little weight for the former; that is to say, its rôle is in induction rather than deduction, unless strict resemblance of relation can be made out, and this resemblance of relation be then traced to a common principle as its ground. In other words, when pupils are engaged in thinking out a new fact or principle, associations by similarity should be encouraged; when they are demonstrating some stated principle, similarities should themselves be shown to be effects of a common cause. J. D.

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Method of. — One of the methods by which a child is taught to derive the sound of a letter or phonogram (a syllable or other unit of pronunciation). (1) A method much employed by teachers in instructing beginners in reading. The underlying principle is that similarity in form implies similarity in sound. Thus, if the child knows his consonants and the words " me " and " rate," he ought to pronounce at sight the new word " relate," the same sound value being given to *e* in both "me " and " re," and to *ate* in both " rate " and " late." If not, the teacher will bring the mastered words into juxtaposition with the new word, so as to assist him in getting the sound by analogy. (2) A method used in teaching the child to comprehend the pronunciation given in the dictionary when he has no knowledge of the sounds which go with the special diacritical marks used. Suppose the child seeks the pronunciation of the word "anoint." The word "anoint" is marked "ȧ-noint′;" but the child does not know the sound that accompanies ȧ. He glances at the list of simple known words at the bottom of the dictionary page until he finds a word containing ȧ similarly marked. He finds the word "ȧsk," and transfers the sound of ȧ in "ȧsk" to the word "anoint." The method of analogy is likewise applicable to spelling and other subjects. H. S.

See Reading, Teaching Beginners.

ANALYSIS. — The term used to characterize the "first step" in the procedure of the recitation, more particularly in the "inductive development lesson."

See Apperception; Preparation; Recitation, Method of.

ANALYSIS. — In mathematics the term is used in several senses. The primitive use is in the sense of the resolution of a compound into its elements, and in particular the proceeding to resolve a statement sought to be proved into sub-statements that have already been proved. Synthesis, on the other hand, is the proceeding from truths that have already been proved to the truth that we wish to prove. Generally we ascertain the method of proving a proposition in mathematics by analysis, and this we follow by a synthetic proof, as in elementary geometry. In another sense the word is used to mean algebra (*q.v.*), and in particular higher algebra, or the discussion of a problem by means of algebra instead of geometry, and hence our analytic geometry (*q.v.*). It is more commonly used at present, as designating a branch of mathematics, to refer to the differential and integral calculus, which are sometimes called Infinitesimal Analysis, and which include differential equations, the calculus of variations, and other branches.

D. E. S.

ANALYSIS AND SYNTHESIS. — In one form or another analysis and synthesis have always been recognized as fundamental functions of intelligence or reflective thought. Since it appears paradoxical that thinking should at once distinguish particulars and connect by universals, the nature of the relation between the functions has been one of the persistent problems of logical theory. The objective counterpart of this problem, or the relation of the one and the many, unity and plurality, has been a basic question for metaphysics, all kinds of systems, from thoroughgoing atomism through various compromises over to absolute monism, arising according to the degree and kind of emphasis placed upon analysis on one side or synthesis on the other. In the theory of educational method, no question has been more vigorously discussed than the relative values of analytic and synthetic methods in teaching reading, number, geography, nature study, etc. And in many cases where there has been no overt controversy, the changes that have occurred in method of instruction will be found upon examination to consist in shifting from analytic to synthetic methods of attack, or vice versa, or in combining the two methods in different ratios.

If we note some of the terms that are practically equivalent to analysis and synthesis, we shall recognize more easily the essential significance of these terms. Discrimination, discernment, distinguishing, demarcating, in fact all names that indicate acts that result in marking anything out and off in experience so that it gains in *specification*, that is, in peculiar individuality, express operations that are analogous to analysis. Abstraction represents analysis carried to the point where some aspect or relation incapable of separate existence is discriminated from its actual context so that mentally at least it seems to have independent existence. Identification, connection, unification, systematization, are corresponding synonyms for synthesis. In all cases it is obvious that synthesis implies the notion of continuity, of necessary reference of one thing to another, just as analysis means particularization, or parting a thing off on its own account. The general bears the same relation to synthesis that the abstract bears to analysis. When the abstracted relation or quality is reapplied to particular cases so as to bring them into one class (or genus) or under one principle of explanation, generalization occurs. Psychologically analysis corresponds to the well-known fact that all attention consists in an increase of *clearness* coincident with emphasis on the subject matter attended to, while synthesis corresponds to the tendency of all subject matter of attention to gather in relations of subordination about a single focus. For just as in attention mental darkness gives way to clearness, so dispersion gives way to concentration or orderly grouping. Going from the technical terms to the empirical facts they ultimately signify, analysis means *clearness through emphasis*, synthesis means *order through place in a context*.

The bearing of these conceptions may be brought out by contrasting them with the definitions frequently given in pedagogical writings, according to which analysis means mentally breaking a whole into its parts, while synthesis means the mental composition or putting together of parts into a whole. These definitions are not necessarily incorrect, but they are apt to be misleading because they tend to make us conceive analysis and synthesis as some sort of mental counterparts, a physical breaking up, or taking to pieces, and of a physical putting together. Now physical dissection and composition both operate upon a ready-made object, upon something which is already given. Hence mental analysis is thought of as a picking to pieces in the mind of an object which is already mentally given, that is known; and conversely, synthesis as a piecing together of a number of qualities and relations already known. We analyze — so it is thought — a table by enumerating all its properties, — size, form, color, material, use, etc. By combining a certain color, flavor, size, texture, odor, etc., we would get synthetically the notion of an orange.

But the important thing in genuine analysis and synthesis is that they do not operate with and upon what is already present and given (*i.e.* known), but are aspects of the process of *getting* knowledge, that is, of advancing from what is partially known to more adequate knowledge. If the table were already well known, there would be no sense in decomposing it mentally into its constituent properties. The table already is these properties; they are the table. Only if we were not sure whether the object was a table or what kind of a table it was (how much it was worth, whether it would fit our needs, what period it belonged to) should we proceed to select or emphasize any particular aspect of the object. We analyze because there is a specific end to be attained; and we analyze only so as to get clear and reliable indications of the means to be used. If some one feature serves as an adequate evidence of the object's being a table, or being the kind of a table we want, or worth the price asked for it, we stop there; if more indications are necessary to settle the matter, we go on with our analysis till we think sufficient data for a correct conclusion are at hand.

Synthesis is the correlative process of interpreting some fact or quality which is perplexing and obscure because of its isolation. We do not put together a number of qualities of taste, smell, touch, and sight that we are already thoroughly familiar with in order to make up an entire object we are equally familiar with; but hitting upon some smell or color we wonder what it means. The only answer to that question is the discovery of some object — a flower, an orange, or whatever it may be — of which it is a distinctive connected part.

These considerations illustrate the three most important principles of analysis and synthesis. (1) They are performed for the sake of teaching a specific conclusion; or are parts of a process of inference. They are never ends in themselves, or performed simply on their own account. (2) Being controlled by the special end in view, they are always limited as to their extent by reference to the end. We analyze only far enough to get clearly reliable signs with reference to the purpose in hand; we do not synthesize indefinitely, but only till we have interpreted a particular isolated puzzling phenomenon by so placing it in relation to other things that it is understood. (3) Each process requires the other for its own completion, no matter which one happens to be most prominent at the beginning. They are correlative, not independent, functions. It is for the sake of determining the nature of some conclusive whole that we dwell upon and render conspicuously clear any special trait; it is only by detailed examination and inspection, clearing up some particular feature, that we get any sure basis for passing upon the nature of the whole. The sense of the whole end controls what we emphasize and how far we carry our selection and examination for particulars; the character of the particular qualities that stand out clearly are the sole guides we possess in reaching a definite conclusion as to the nature of the whole.

All three of these normal principles are frequently violated in methods of teaching.

(1) Analysis and synthesis are frequently treated as ends in themselves. The kindergarten child analyzes geometrical forms; the elementary pupil analyzes sentences in grammar and objects in " object lessons " or in nature study; the high school pupil carries the observation of distinctions and differences into mathematics and the sciences; and in too many cases the analysis is not performed so as to clarify the means or the data requisite to achieve some end in experience, but simply to multiply information as to details of facts. While acquaintance with facts is the nominal purpose, too often the student only acquires terminology, for facts appeal to any one *as* facts only when they perform a required function in controlling the achievement of an end or solving a problem. Nor is it enough to have some general end in view, such as acquiring more knowledge or information. The aim must be specific, and must arise normally in the individual's own experience.

(2) Making analysis an end in itself always results in violation of the second principle, that of selective emphasis. There being no specific end to control the process of noting particulars, it has no limiting principle. Theoretically anything and everything about the object is of equal importance; hence none of the qualities should be slighted or passed over. All must be enumerated. The tedious nature of this exhaustive analysis is sufficient evidence of the way in which it violates normal mental action.

(3) The very discussion as to whether certain subjects should be taught analytically or synthetically is proof of the violation of the third principle. No subject can be intellectually acquired except by using both methods, it being a matter largely of accident and convenience which phase comes first. The child begins reading with isolated letters or isolated phonic elements. Having mastered a variety of these, he then goes on to combine them into words,

and then to combine words into sentences. The mutual character of analysis and synthesis is wholly lost from view. In fact, the only reason for discriminating special forms and special sounds is to get hold of the special tool necessary to master some complete meaning, — and the analytic recognition of special sounds and forms would be accomplished more effectively if performed for rendering clear some special letter, word, or sound important in view of getting a larger and inclusive meaning. On the other hand, teachers, in reaction against a method which compels children to occupy themselves for such a long time with senseless forms, begin with whole words, or sentences. But there is no way of attaining a mastery of the meaning of groups of words, or of letters, save to master the particular traits that are important as signs. Even if the child is deliberately discouraged from such analysis, he advances in reading ability only because he unconsciously works out some analytic method for himself.

This discussion of the pedagogical violation of logical principles has considered the matter merely from the side of analysis, but the same errors could easily be illustrated from the side of synthesis. Learning general principles, rules, and definitions by themselves instead of as methods of identifying and handling particular cases is an illustration of making synthesis an end in itself, of removing the natural limitations that make it selective, and of isolation from analysis. J. D.

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ANALYTIC GEOMETRY. — That branch of mathematics in which geometric truths are investigated by means of analysis (*q.v.*), and in particular by means of algebra, through the one-to-one correspondence between points in a plane or in space and quantities in an equation. More broadly considered, it enables the mathematician to investigate a geometric problem by putting it into the form of an algebraic equation and, conversely, to carry on an algebraic investigation by the aid of geometry, and in general to pass from either of these two branches of mathematics to the other in the course of his research, as may be convenient.

History. — The Greeks carried the subject of elementary geometry (see Geometry) to a high degree of development in the works of Euclid (*q.v.*) and Archimedes (*q.v.*). They then directed their attention to bringing the study of conics (*q.v.*) to a similar state of completeness, and this culminated in the works of Apollonius (*q.v.*). From this time to the seventeenth century there was no great advance in geometry as distinct from trigonometry. The invention of analytic geometry is usually ascribed to Descartes (1637), but considerable work had been done before this time by way of preparation. Apollonius himself had referred the conics to their diameters and tangents, and had expressed the relation by means of equations between areas, so that he practically used abscissas and ordinates. He proved, for example, as Menæchmus had done before him, the property of the parabola which we now express by the equation $y^2 = px$, and in general he knew the most important properties of all the conics that are represented at present by such symbolism as this. While not commonly using the word " ordinate " directly, he frequently uses *τεταγμένως*, ordinate-wise. His full form for ordinate is *τεταγμένως καταγομένη*, and occasionally he uses each of these words by itself to mean an ordinate. He uses an expression meaning " the (portion) cut off by it (the ordinate) from the diameter toward the vertex " as the equivalent of " abscissa." In the Latin translations of his works these expressions appear as *ordinatim applicatae* and *abscissae*, the former shortened by Fermat (*q.v.*) into " applicate " and by others into " ordinate." In the medieval universities a kind of coördinate geometry appears under the name *De Latitudinibus Formarum.* The *latitudo* was the ordinate and the *longitudo* the abscissa, as in ordinary map-drawing. A variable point could thus be referred to rectangular coördinates and a *figura* formed. By this means Oresme (*q.v.*), for example, studied geometric figures, including the parabola, but always in the first quadrant. This work was extended by such investigators as Viète (*q.v.*) and Roberval, and particularly by Fermat, the latter often being called the inventor of analytics. It was Descartes (*q.v.*), however, who first set forth the essential features of the science, showing the full significance of the positive and the negative quantity with relation to points in the four quadrants, and the one-to-one correspondence between values of x and y, and points on a curve. The effect of the work of Descartes was to greatly stimulate the study of the ancient conics and to revolutionize methods of mathematical investigation. The extension of the theory to space of three dimensions was effected by the efforts of Van Schooten, Parent, and Clairaut, and resulted in Euler's (1731) theory of surfaces. The nineteenth century saw the entire subject amplified, other systems of coördinates being introduced for the treatment of certain classes of problems not readily handled by means of the rectangular ones of Descartes or the oblique ones of his immediate successors.

General Nature as now conceived. — At present analytic geometry has for its first objects of study the conic sections. The common propositions were known to the Greeks, but are established more expeditiously by analytic methods. Higher plane curves are next considered, including some that were known to the Greeks (the cissoid, conchoid, and spiral of Archimedes, for example), and others of later invention, like the limaçon of Pascal, the Cassini ovals, and the witch of Agnesi. Curves are usually first referred to rectangular coördinates, and then, as the student advances, to oblique coördinates. Polar coördinates are next introduced, a pole, an axis, an angle, and a radius vector sufficing to fix any point on a plane. These three classes of coördinates answer for ordinary cases. The number of systems of coördinates is, however, unlimited. Sometimes two poles can be used to advantage, — the bipolar system; at other times three lines in a plane can better be used, — trilinear coördinates, and so on. For any adequate understanding of the subject the reader must refer to the standard texts.

Present Status in the Curriculum. — At present it is the custom of colleges in the United States to teach analytic geometry in the sophomore year, the fourteenth school year of the student. It is preceded by a year's work in higher algebra, trigonometry, and often in solid geometry. It is taught either for a half year or for a year, and is followed by a course of greater or less length in the differential and integral calculus. It is still largely devoted to the ancient propositions on conics. In the way of reform several changes have been advocated. One is that the dividing line between analytics and the calculus be partially removed, to the end that a student may use his calculus while studying the curves to which it applies, and use his analytics in the problems in the calculus where it is helpful, and do all this just at the right time, without waiting a year and having to review the subject. Another suggestion is that some analytic geometry be taught in connection with algebra, and this is done by the use of so-called *graphs* in the latter subject. It is further suggested that the high school take over the trigonometry and solid geometry, leaving analytic geometry for the first year of college. All of these suggestions have merit, but no one is likely to be fully carried out. It seems probable, however, that a moderate amount of graphic work with rectangular coördinates will be done in the course in elementary algebra, that trigonometry will be treated more in accord with the usages of analytics, and that there will be a conservative merging of analytics and calculus. D. E. S.

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On the present theory there are numerous works of high grade, such as Briot and Bouquet's *Leçons de Géométrie analytique*, English, by Boyd (Chicago, 1896), and various encyclopedias of mathematics.

ANALYTIC METHOD. — A special method of teaching reading to beginners, in which the first reading is mastered in "thought wholes" (sentences, phrases, or words), which are then analyzed or broken into parts (syllables, phonograms, letters). These derived parts or units are then used as a basis for interpreting the sounds of other words, phrases, and sentences. The "analytic" and "synthetic" methods are very frequently used as supplementary means in the teaching of beginners. "Sentence," "phrase," and "word" methods are types of analytic methods.

See ANALYSIS AND SYNTHESIS; READING, TEACHING BEGINNERS; SYNTHETIC METHOD.

ANARTHRIA.—The loss of or a defect in the ability to articulate. The condition is normally found up to 3 or 4 years of age in young children who have not gained sufficient control of the muscles to properly coördinate them for the production of speech sounds. If the condition persists beyond the usual age of speech acquisition, it is pathological. The condition is sometimes produced in older people by disease of parts of the nervous system, especially those associated with the movements of the tongue. The term has sometimes been used to describe association speech defects of the nature of motor APHASIA (*q.v.*), both cortical and subcortical.

See SPEECH, DEFECTS OF. S. I. F.

ANATOLIUS. — Church Father, born in Alexandria about A.D. 230 and educated in the Christian school of his native city under Dionysius the Great in all the religious and scientific learning of his day. About 270 he succeeded Eusebius as Bishop of Laodicea. We are dependent upon the historian Eusebius, who describes him as surpassing all men of his time in learning, for information about his life and work (*Eccles. Hist.* Bk. VII). He attained the highest eminence in mathematics, rhetoric, and philosophy. In his *Institutes of Arithmetic* he recognizes eight branches of Mathematics: Arithmetic, Geometry, Computation, Geodesy, Optics, Theoretical Music, Mechanics, and Astronomy. He defines mathematics as "A theoretic science of things apprehensible by perception and sensation for communication to others." He illustrates its greatness by saying that "It begins with a point and a line and forthwith takes heaven itself and all things within its compass," and applies to it Homer's description of Discord —

> "Small at her birth, but rising every hour,
> While scarce the skies her horrid head can bound,
> She stalks on earth and shakes the world around."

In his work on *The Chronology of Easter* he practically settled one of the burning questions of the day and helped to lay the foundations of the modern science of astronomy, the only practical application of which up to this time had been to such problems as this. He did not write many books, and only small fragments of these have been preserved. W. R.

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ANATOMY. — See Medical Education; Zoölogy.

ANCIENT LANGUAGES. — See Greek; Latin; Oriental Languages.

ANDERSON, JOHN, M.A., F.R.S. —(1726–1796). The founder of Anderson's University, Glasgow, was born in 1726. Educated at the University of Glasgow, he was appointed Professor of Oriental Languages in 1756 in that university, and in 1760 was transferred to the chair of natural philosophy. During his tenure of the latter chair, he perceived that a knowledge of the principles of natural philosophy was invaluable to mechanics, and this led him to establish, in addition to his usual class, a more popular course for those whose pursuits did not allow them to follow the regular academic curriculum. These lectures he continued until his death in 1796. On his death, he bequeathed the whole of his property with a few trifling exceptions " to the public, for the good of mankind and the improvement of Science in an institution to be denominated Anderson's University and to be managed by 81 trustees." According to the design of the founder there were to be 4 faculties, each composed of 9 professors, viz., arts, medicine, law, and theology. As the funds were quite inadequate to carry out this object, the institution was at first commenced with a single course of lectures on natural philosophy and chemistry by Dr. Thomas Garnett. In 1796 courses were instituted in mathematics and geography. In 1799 Dr. Garnett was succeeded by Dr. Birkbeck (afterwards founder of the Birkbeck Institution, London) who, in addition to the branches taught by his predecessor, gave free lectures on mechanics and other scientific subjects. This was the origin of the popular lectures in Anderson's University and of Mechanics' Institutions in Great Britain. The faculties of law and theology have never been established, but the medical college came into being in 1799 by the appointment of a lecturer on anatomy and surgery. The medical school has at the present time a full complement of professors, and supplies a sound medical education at a cost suited to the circumstances of many who could not otherwise enter the profession. In 1884 the medical school became a separate and distinct institution under the name of Anderson's College Medical School, the parent institution continuing its popular day and evening art and science classes. A. D.

ANDOVER THEOLOGICAL SEMINARY, CAMBRIDGE, MASS. — Chartered in 1807 and opened in 1808. In 1908 the institution removed to Cambridge and entered into an arrangement with Harvard University whereby there is an exchange of privileges and the resources of each are made available to students of both institutions. The seminary is open to all Protestant students of church membership and graduates of an approved college. This curriculum is one of three years. Students may divide their work between Harvard University and the Seminary. Courses are offered in the Old and New Testaments, Church history, systematic theology, and homiletics. Fourteen courses are required for the degree of Bachelor of Divinity, three of which may be taken at Harvard. Students who are not candidates for a degree may receive certificates from the seminary. There is a faculty of 6 professors, 3 lecturers, and an assistant. The library contains books in departments of Biblical study, historical, systematic and practical theology, and in missionary literature of every kind.

ANDRÉ, CHRISTIAN KARL (1763-1821).— A German educator and journalist. He was born in Hildburghausen. In 1782, he started an educational institute in Arolsen, which three years later he left to become a teacher in Salzmann's Philanthropinum in Schnepfenthal. In 1798, he accepted a call to become the principal of a Protestant school in Brünn. There, as well as in Stuttgart, where he settled in 1821, he continued his literary activity, the chief object of which was the educational uplifting of the masses of the rural population. For this purpose he wrote many pamphlets and published a number of periodicals, such as *Der Landmann* (*The Farmer*) (1790–1795), *Patriotisches Tageblatt* (*Patriotic Journal*) (1800–1805), and *Hesperus* (1809-1821).

ANDREÆ, JOHANN VALENTIN (1586–1654). — A German theologian and friend of Comenius. Born in Herrenburg, Würtemberg, and educated at the University of Tübingen, he filled various ecclesiastical positions in his native country and died as court preacher in Stuttgart. Andreæ may be regarded as a forerunner of Spener, the founder of Pietism. In education he was opposed to mere verbalism, and laid emphasis on moral and religious training. Among his writings, which are full of wit and humor, is *Turbo* (1616), a dramatic satire on the scholars of his time; also *Christianopolis* (1619), a sort of Christian Utopia, and *Die Christenburg* (1626) (*The Christian Castle*), an allegory, representing the Church as a besieged city. The opinion that he was the founder or restorer of the order of Rosicrucians is erroneous.

ANDREW COLLEGE, CUTHBERT, GA. — Founded in 1854, by the Methodist Episcopal Church, South, and controlled by the South Georgia Conference. Literary, business, and fine arts departments are maintained. Admission requirements amount approximately to one and a half years' high school work. Degrees are conferred. There is a faculty of 11 professors. T. W. Malone, M.A., D.D., is the president.

ANDREWS, ETHAN ALLEN (1787–1858). — Schoolman and textbook writer, educated in the public schools of Connecticut and at Yale College; professor of ancient languages in the University of North Carolina (1822–1828); principal of a private school for girls in Boston (1833–1839); author of an extended series of Latin texts for use in secondary schools and colleges. W. S. M.

ANDREWS, ISRAEL WARD (1815–1888). — Educator and author, educated in the public schools and at Amherst college; teacher in academies in Massachusetts (1835–1839); professor in Marietta College (1839–1855); president of the same (1855–1885) and again professor (1885–1888); author of numerous articles in educational journals. W. S. M.

ANDREWS, LORIN (1819–1861). — Educator and author, educated at the Kenyon Grammar School and at Kenyon College; prominently identified with public school work in Ohio; president of Kenyon College (1854–1861); contributed numerous articles to educational journals. W. S. M.

ANDREWS, ST., THE UNIVERSITY OF. — A coeducational institution founded in 1411 by Henry Wardlaw, Bishop of St. Andrews, is the oldest of the four universities of Scotland. It is now composed of three constituent colleges, viz.: The United Colleges of St. Salvator (founded in 1450) and St. Leonard (founded in 1512); St. Mary's College (founded in 1537); and University College, Dundee (*q.v.*) founded in 1880, affiliated to and made an integral part of the university in 1897.

In 1597, St. Salvator's and St. Leonard's were united and restricted to the teaching of philosophy, law, and medicine and the College of St. Mary's to the teaching of theology. This arrangement continues to the present day, St. Mary's College being the divinity faculty of the university, whilst courses in arts, science and medicine are taught within the United Colleges. There is a principal in each of the colleges. Each principal presides over his own college, but the principal of the United Colleges is the head of the University and the president of the Senatus Academicus. The work of the university is divided into five departments or faculties, viz.: the faculties of divinity, medicine, arts and science, and law; and the total number of students is about 550; the largest faculty is that of arts, comprising over 360 students.

The United Colleges of St. Salvator and St. Leonard have the greatest number of students, over 300: University College, Dundee, comes next, with over 200 students; while St. Mary's College is attended by some 20 to 30 students annually. The only vocational degree granted other than those for the learned professions is that of Bachelor of Science in Engineering, which falls under the Faculty of Science.

A. D.

ANDREWS, SAMUEL (1656–1738). — The second president of Yale College; graduated from Harvard College in 1675. He engaged in the work of the ministry for several years and succeeded Abraham Pierson as president of Yale in 1707 and continued at the head of the college until the time of his death in 1738 W. S. M.

ANESTHESIA, or ANÆSTHESIA. — Literally, a loss of feeling or of sensation, is a term used to designate the following different, but in many respects similar, conditions: (1) general surgical anesthesia or narcosis; (2) local surgical anesthesia and (3) sensation losses from injury, disease, or other functional derangement of parts of the nervous system.

In reference to the third class, the anesthesia of endogenous origin, some people use the term popularly with a broad connotation to include losses of sensations of sight, of hearing, of pain, of touch, of pressure, and of all other sensations, and it is commonly used to indicate the loss of ability to appreciate the sensations normally obtained from stimulation of the skin and underlying tissues. The best usage is that in which the term is restricted to indicate the inability to appreciate sensations of light, touch, and, possibly, pressure. For the losses of ability to appreciate other kinds of sensation the following special terms are used: blindness, deafness, anosmia, ageusia, analgesia, thermoanesthesia (*qq.v.*).

(1) General surgical anesthesia is usually produced by the inhalation of the vapor of sulphuric ether, of chloroform, of nitrous oxide, or of certain combinations of these. The ingestion or injection of the derivatives of opium and of other alkaloids and of some synthetic chemical compounds also produces states similar to those following the use of chloroform and ether. The inhalation of one of the gases mentioned above produces at first a feeling of suffocation, which is fought against, a stupefaction, and finally loss of consciousness. In the last state voluntary movements cannot be performed and external stimuli are not consciously appreciated. Movements of a reflex character, however, may be produced by appropriate stimulation and certain bodily changes, notably of the respiratory and circulatory systems, take place in an almost normal manner, unless the amount of the anesthetic be excessive. In every deep narcosis all movements, including those of a reflex nature, cease, and death may result. There is an amnesia for the anesthesic period of time.

The action of morphine and of other similar agents resembles that of ether and chloroform, but in place of a complete amnesia there may be a remembrance — but usually of a delirious nature.

(2) Local surgical anesthesia may be produced by a variety of agents, of which cold, and cocaine and its chemical derivatives, are the most important. The application of a mixture of ice and salt or the spray of ether, of ethyl chloride, of methyl chloride, and of many other liquids of low boiling point produces a greater or less freezing of the parts to which they are applied, and there is loss of certain sensations in that part. After freezing the skin, for example, the sensations of pain, of pressure, of touch, and of temperature are abolished for a time, the duration of the anesthesia depending upon the amount of the freezing and the temperature of the surrounding air. The sensory nerve endings are not all equally affected by applications of short duration, nor does the effect persist for the same length of time for all the different sensations. Pain and temperature sensations appear to be most affected. Thermal stimuli, especially cold, cannot be felt as such, even after a very brief application of the freezing spray, although light touches and pressures can be well felt. Pain sensation is abolished for several minutes, and remains subacute for a comparatively long period. Touch and pressure sensations are the last to disappear and the first to reappear.

Anesthesia from cocaine and its derivatives is produced by the subcutaneous injection of solutions of these substances or by the application of them to mucous surfaces. In some parts of the body cocaine produces a true analgesia without an anesthesia, but usually affects all kinds of sensation in the part to which applied.

(3) The anesthesias of an endogenous (within the body) nature are of more pedagogic interest and importance. Changes in sensation may be produced by alterations in the structure or in the conducting power of any part of the afferent system. It is assumed that impulses which are started by stimuli do not become conscious parts of us, *i.e.* do not become sensations, until they reach the cerebral cortex (see article on NERVOUS SYSTEM especially cerebrum). A sensory system consists of the receiving element in the skin or other organ, the peripheral nerve that conducts the impulses to the spinal cord and through it to certain subsidiary centers in the mid-brain (*e.g.* the thalamus), and the nerve tract leading to and the cells in the cerebral cortex. Theoretically it is possible to have a change in sensation in any small or large part of the body due to functional or structural alterations in some part of this afferent system. In practice, however, it is found that the sensation losses have rather definite characteristics and distributions.

When a peripheral afferent nerve is cut, sensation is lost over a considerable skin area. Stimuli of light touch, of pressure, of temperature, and of pain are not appreciated, and the area is anesthesic, analgesic, and thermoanesthesic. Surrounding this area of complete loss there is usually a narrow band from which the sensations of pain, of pressure, and of hotness and coldness may be obtained, but not the sensations of light touch and of warmth and coolness. Such an area is well defined but not sharply marked off from all other skin areas.

The section of a posterior root of the spinal cord is accompanied by similar but not corresponding losses, but the definition of areas is not so sharp as in the case of the peripheral nerves. There is, in addition, a marked difference in the areal distribution of the peripheral and the spinal nerves, and this fact enables the physician to diagnose the seat of a lesion causing an anesthesia. An illustration of the varying distribution of the peripheral and spinal nerves in the leg is given in Figure 1. In this figure A represents the approximate distribution of the posterior root fibers and B that of the main peripheral nerves.

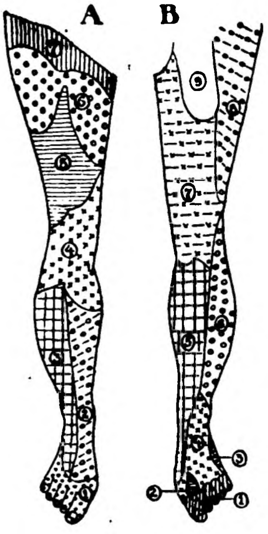

FIG. 1. — Showing the distribution to the skin of the anterior part of the leg of the sensory fibers, A from the posterior roots, B from the peripheral nerves.

A 1, first sacral; 2, 3, 4, 5, 6, respectively fifth, fourth, third, second, and first lumbar; 7, twelfth choratic.

B 1, median plantar; 2, deep peroneal; 3, sural; 4, superficial peroneal; 5, saphenous; 6, common peroneal; 7, anterior femoral and obturator; 8, lateral femoral; 9, genitofemoral.

Adapted from Morris.

Organic disturbances of the spinal cord and the brain produce a widespread sensory change, but the combination of sensory losses are usually different to those found in lesions of the peripheral nerves and of the posterior roots. At times functional derangements of the central nervous system may be accompanied by anesthesia of slight extent. Figure 2 illustrates some of the kinds of anesthesias from spinal cord and brain lesions.

The most common diseases in which these forms of anesthesia occur are: injuries to or inflammation of the brain and its membranes, disease of the spinal cord, posterior columns and horns, hysteria and the traumatic neuroses. From injury or disease of the brain mono- and hemi-anesthesias are common. In these cases the borders of the anesthetic areas are not sharply defined, and in the case of the mono-anesthesias the distal portion of the limb is always more affected than the part near the trunk. In children cerebral injury may result in a diplegia (a palsy), and be accompanied by a bilateral anesthesia. It is more common, however, to find this distribution from disease or injury to the spinal cord. Disseminated anesthesias are most common in hysteria, and in this disease all other forms of anesthesia may be encountered. The hysterical anesthesia is usually complete and sharply defined, and in these respects is quite unlike the anesthesia from any organic lesion, with the exception of that from peripheral nerve section. The distribution of the anesthetic area in hysteria is usually that of an artificial bodily segment, such as a finger or a hand, and it is not difficult to differentiate the hysterical from organic anesthesia on account of this artificial and unphysiological distribution.

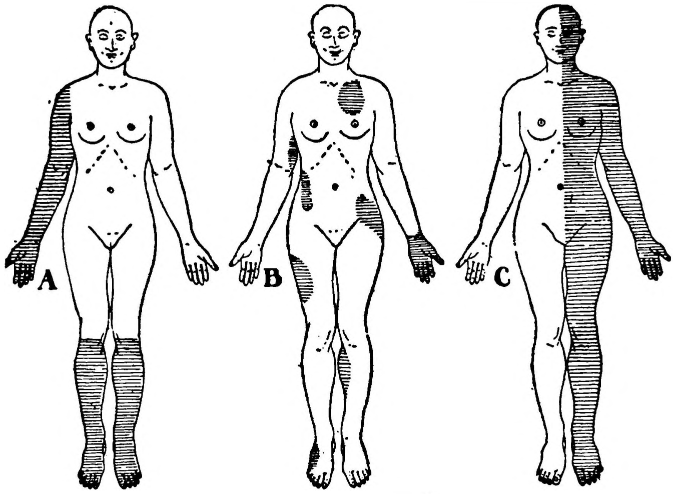

Fig. 2.—Showing various forms of anesthesia from lesion of the spinal cord and brain. A, mono-anesthesia of the arm, and bilateral anesthesia of the leg; B, disseminated anesthesias; C, left hemi-anesthesia.

The sensory losses from lesions of the spinal cord differ according to the level of cord at which the lesion is located and according to the columns or tracts that are diseased. Illustrations of the extent of the sensory changes according to the vertical location of the cord disturbance will be found in many good textbooks dealing with diseases of the nervous system. The sensory functions of special tracts are dealt with in the article on the spinal cord, to which the reader is referred.

Lesions of the post-central portion of the cerebral cortex produce anesthesia or hypesthesia, depending upon the extent and the severity of the lesion. In the cerebral anesthesias it is uncommon to find a complete anesthesia, certain sensations always remaining. Lesions of the mid-brain, however, may be followed by a hemi-anesthesia for all forms of skin sensation, especially if the internal capsule or the thalamus be involved.

The differentiation of the sensory disturbance and the diagnosis of the lesion causing the particular type of anesthesia are matters for the neurologist, but the teacher should be informed of such conditions in the children under her control that she may adjust her teaching to the child's endowment. All education has for its aim the adjustment or the association of sensory and motor impulses, and it is a truism that when either the motor or sensory endowment is less than normal, or when there is a marked defect in either of these spheres, the child cannot have normal responses to appropriate stimuli. This is well recognized in cases of paralysis, because we can see the defect or the result of the defect, but most people, physicians as well as the laity, take little account of the conditions which do not intrude themselves upon their vision. The effect of certain sensory losses and the educational application of these facts are given in the article on ataxia (*q.v.*), and the application of similar facts to educational procedure may be made in the same way. At present we know too little of the psychology of the mentally and morally defective, but from observations already published it appears that moral as well as physical defects are associated with sensory disorders, and it follows that in the education of both classes the method of dealing with normal children, *i.e.* on the assumption of perfect sensory and motor endowment, is ineffectual, and a waste of time for both pupil and teacher. It is understood, and understanding is followed by practice, that the blind may be reached through touch and hearing sensations, but it is apparently not understood that certain people are anesthetic or hypesthetic and that they must be reached through other senses. S. I. F.

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ANGER. — A form of emotional reaction closely related to fear in its physiological conditions. Elaborately described by James in his *Talks to Teachers* (New York, 1899) and McDougall in his *Social Psychology.* (London, 1909.)

See EMOTIONS.

ANGLO-NORMAN DIALECT.— This curious dialect plays a very important part in the medieval history of English education, and that part has a direct lesson for education in modern times when (as in the case of India) a foreign language is forced upon the schools. The experience of the Middle Ages, like the experience of the English in India, shows that little but loss can result from so irrational a process. The history of the dialects can be briefly related. The use of French had become common at the English court before the Conquest, but with the advent of William in 1066 it became in its Norman form the official language. Official documents and all enactments were in Latin or Anglo-Norman, and William I directed that all children should learn their lessons in French. We know this from Higden's *Polychronicon* (1327), which tells us that "children in school against the usage and manner of all other nations are compelled to leave their own tongue" and do all their school work in French and that this had been the case since the Normans came first to England. The use of French prevailed at the universities as well as in the schools (see H. Anstey's *Munimenta Academica Oxon.* pp. lxx and 438). This curious tongue during the three centuries of its use broke up (in England) into various sub-dialects, and a very considerable and important literature both in verse and prose survives. But it probably never became really popular (see M. J. Vising, *Étude sur le Dialecte Anglo-Normand du xii^e Siècle :* Upsala, 1882). It was finally undermined by the Black Death (*q.v.*) of 1349. John de Trevisa (the editor and translator of the *Polychronicon* in 1385) tells us that soon after 1349 John Cornwaile, the schoolmaster of Pencriche in Staffordshire, began the movement for the expulsion of Anglo-Norman from the schools, and he adds that in the year of writing, 1385, English is substituted for French in all the grammar schools of England. Even the gentry, he says, were ceasing to teach their children French. The teaching of French was introduced into the schools once more at the beginning of the sixteenth century. But the Anglo-Norman dialect did not entirely die out in the mid-fourteenth century, and must still have been taught to legal apprentices, for, though we know that in 1362 pleas were directed by statute (36 Edw. III., *c.* 15) to be pleaded in the courts of law in the English tongue, defended, avowed, debated, and judged in English, and enrolled in Latin, yet in fact, as we know from the Year Book Reports, arguments and judgments were delivered in Anglo-Norman well into the sixteenth century, while late in that century law books were written in Anglo-Norman. It was a statute of the commonwealth (Act 37 of 1650) that finally abolished the use of Anglo-Norman in legal proceedings. But even to-day Anglo-Norman phrases are constantly used in the Law Courts, while the official language of the King of England in the year 1910 is Anglo-Norman. As a legislative person he intimates his decisions in the Anglo-Norman tongue, while for ceremonial uses the tongue is still alive; so persistent is the tradition that has its origin in Norman influence over Saxon England nearly nine centuries ago. J. E. G. DE M.

ANGLO-NORMAN SCHOOLBOOKS. — The use of Anglo-Norman in English schools during the three centuries from 1066 to 1366 involved the use of Anglo-Norman schoolbooks. The history of English education can scarcely be followed without some appreciation of this fact. Unfortunately this field has not yet been surveyed in detail, and the various manuscript libraries in England need to be ransacked for this purpose. The following schoolbooks are, however, known: the *De Utensilibus* of Alexander Neckham (1157–1217), a vocabulary in Latin with a gloss in Anglo-Norman interspersed with occasional English words (the book deals with the details of daily life); a vocabulary of the names of plants with an explanation of the Latin names in English and Anglo-Norman (*c.* 1250); a vocabulary in Anglo-Norman with an interlinear gloss in Latin written before the year 1300 by Walter de Bibelesworth at the request of Lady Dionysia de Monchensy of Swanscombe in Kent, with the object of teaching the children of the upper class (for the text of these vocabularies see the *Volumes of Vocabularies* in Mayer's *Library of National Antiquities*, edited by Thomas Wright in 1857); *Orthographia Gallica* (*c.* 1300) referred to by Dr. H. Œlsner in the *Athenæum* for Feb. 11, 1905. It is difficult to accept Dr. Œlsner's view that Trevisa overrated the use of Anglo-Norman in the schools. It does not, however, appear that Anglo-Norman was regularly used in the parochial schools, and Dr. Œlsner probably only means this. A systematic investigation among extant Mss. will clear up these various questions. An Oxford University statute which H. Anstey in the *Munimenta Academica Oxon.* (pp. lxx and 438) refers to the thirteenth century (but which seems to belong to the early fourteenth century) provides that boys shall be taught to construe in French as well as in English in order that the French tongue may not be forgotten. By the end of the thirteenth century Anglo-Norman was rapidly dying as a tongue, and M. Vising and Dr. Œlsner are correct in the view that it was probably never really popular, except possibly in particular districts. To what extent it has left its mark on local dialects in England remains to be seen. J. E. G. de M.

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ANGLO-SAXON. — Anglo-Saxon, or Old English, is the form of the English language in current spoken use, and to a certain extent also in written use, in England from the coming of the English in the fifth century to about the year 1200. As a literary language the vernacular speech within this period acquired considerable dignity, especially in the recording of the native poetical traditions. In the prose, which was throughout more academic and ecclesiastical in character than the verse, the vernacular had to meet a stronger competition with the universal Latin of the Middle Ages. Since most of the Old English writings now extant are preserved in the Early West Saxon dialect, which became standard in the reign of King Alfred (d. 901), it is usually this form of the language which is made the basis of study in the modern classroom.

There are only slight evidences that the vernacular was ever the subject of academic instruction during the Anglo-Saxon period. The most important of these evidences is to be found in the statements of Alfred in the Preface to his translation of the *Cura Pastoralis* of Pope Gregory. (See Alfred, King, as Educator.) Alfred at that place outlines a system of general education according to which all English boys are to be instructed in English until they are able to read (and presumably also to write, though this is not specifically stated) English writing. After this those students who are to be prepared for the higher activities of Church and State may proceed, according to Alfred, to the study of Latin. It is not probable that Alfred's scheme for the training of Anglo-Saxon youths in English was ever very extensively carried out. For one thing the disturbed state of public affairs during the Old English period hardly permitted the elaboration of such a comprehensive educational system. Nevertheless, it is certain that some students must have received a good deal of formal instruction in their mother tongue, since it was only by such instruction that the language could be held in the dignified and standard position which for at least four centuries it maintained. It is probable also that formal instruction in Anglo-Saxon was carried on in some of the English monasteries as late as the middle of the twelfth century, since some of the historical writings in Anglo-Saxon, of that period, exhibit a conservative and traditional form of the language different in many respects from the contemporary speech. No textbooks, so far as we are aware, were written for the purpose of instruction in English during the Anglo-Saxon period. Such schoolbooks as were given English form, for example the *Colloquies* and the *Grammar* of Ælfric (*q.v.*), were written for the primary purpose of instruction in Latin, and the English translations are interesting to the student of the vernacular merely as indications that schoolboys found English an easy approach to Latin.

After the Norman Conquest the English of the preceding period became rapidly unintelligible even to an educated Englishman. Chaucer, for example, could not have read the *Beowulf*, if he had chanced upon a manuscript copy of it. And Caxton, who was somewhat more expert in languages, tells us (preface to his *Eneydos*, 1490) that Old English seemed more like Dutch to him than English, and that he could not understand it. And the false archaisms of Spenser prove a very inadequate knowledge not merely of Anglo-Saxon, but even of Middle English, on his part.

The return to the manuscript records of Anglo-Saxon in the effort to understand and interpret the language did not occur until the beginning of the sixteenth century. The impulse was then not literary, scientific, or academic, but ecclesiastical and legal. Students of English law, on the one hand, were led back to the study of Anglo-Saxon documents in their effort to determine the oldest traditional custom and law of the English people. Ecclesiastics of the Reformed party, on the other hand, used Anglo-Saxon records, especially the sermons of Ælfric, to strengthen in general the claims of the English Church to independence and purity of doctrine, and to prove in particular that the teachings of the Church of Rome had been different in early days from those which she now professed, thus, as they maintained, controverting the Romish theory of doctrinal immutability. It is this ecclesiastical interest which accounts for the important part which such great churchmen as Matthew Parker and William Laud took in the revival of Anglo-Saxon studies.

The first book printed in Anglo-Saxon appeared in 1567, and was entitled, *A Testimonie of Antiquitie, shewing the auncient fayth in the Church of England touching the sacrament and bloude of the Lord here publikely preached, and also receaved in the Saxon's tyme, above* 600 *yeares agoe.* In the following year appeared a work on Anglo-Saxon laws by William Lambarde, entitled 'Αρχαιονομία, *sive de priscis Anglorum legibus libri, sermone Anglico,* etc. Other early Anglo-Saxon books are of similar character, the prevailing interest in matters theological and legal discouraging the study of the poetical and historical prose manuscripts. Relatively little attention was paid to the language itself. One of the first indications of an attempt to provide for the serious study of the language is to be found in Sir Henry Spelman's plan for the establishment of a lectureship in Anglo-Saxon at Cambridge University. According to the conditions of the lectureship, the holder was to deliver two lectures annually, " one on Saxon learning, the other on the old church history and creed of England." But Sir Henry Spelman died in 1641, and the lectureship, though held by at least two persons, Abraham Wheloc and William Somner, was never permanently established. As the terms of this projected foundation indicate, the study of the language was still regarded as important mainly from the point of view of English Church history. The first Anglo-Saxon work of any extent to be printed as a whole was Bede's *Historia Ecclesiastica Gentis Anglorum*, edited by Wheloc in 1643. The first extensive verse published was the religious poetry of Cædmon, edited by the Dutch scholar, Franciscus Junius, Amsterdam, 1655. Toward the end of the seventeenth and in the early eighteenth century, however, interest in the antiquities and history of the English people led to the publication of works of more general interest, and from this period, also, date the first grammars and glossaries of the language. In the year 1750 the first permanent provision was made for the study of Anglo-Saxon. This was a chair for the study of Anglo-Saxon in the University of Oxford, founded by Dr. Richard Rawlinson. The professorship is still in existence, and is now honorably filled by one of the foremost English scholars of the day. This brief chronological survey may be closed by noting that the first complete edition of the most important poetical monument of the Anglo-Saxon period, the *Beowulf*, did not appear until 1815, edited by the Danish scholar, Thorkelin, in Copenhagen.

At the end of the eighteenth and in the early nineteenth centuries, the study of Anglo-Saxon was given a new direction as a result of the investigations in comparative Indo-European linguistics which occupied so much of the scholarly thought of the time, especially in Germany. These historical and comparative views were first fully formulated in Grimm's *Deutsche Grammatik*, 1819, a book which may be taken as the starting place of the modern attitude toward Anglo-Saxon and the Germanic dialects in general. Since this time the study of Anglo-Saxon from the purely linguistic point of view, both as an individual dialect, and comparatively as a member of the Indo-European family, has been increasingly prominent and productive. The modern scientific and historical method of the study of literature has also led to the careful study of all the surviving monuments of literary interest of the Old English period.

The position which Anglo-Saxon at present occupies in academic instruction is defined and well established. Most European, and practically all English, American, and German universities, provide advanced courses for the study of Anglo-Saxon, usually under the direction of a professor of English philology. These courses are concerned both with the study of the language from a scientific point of view and with the interpretation of the literature. In the United States the colleges almost universally offer undergraduate reading courses in Anglo-Saxon, which are taken usually as electives in the student's third or fourth year. In England Anglo-Saxon is not taught in schools of lower grade than the universities, nor is it included in the courses of study of the German gymnasiums. The secondary schools and the grades, in the United States, have never given a place to Anglo-Saxon, except in rare sporadic instances. The difficulties of the language are not such as to make the elementary presentation of it impracticable, but the present crowded condition of the curricula in grammar and secondary schools leaves little place for a study apparently so remote as Anglo-Saxon.

It is generally assumed, however, that a thoroughly trained student of English will be familiar with the Anglo-Saxon language and literature, and such study is universally made a prerequisite to the higher university degrees in English. The study of the language is regarded as an especially necessary and helpful part of the preparation of teachers of English. The justification for such study on the part of teachers who may not themselves be called upon to give instruction in Anglo-Saxon is assumed to lie not in the disciplinary value of the study of the language, but in furnishing students with a background of historical information necessary for the intelligent understanding of the facts of Modern English. The study of Anglo-Saxon is the most effective means of introducing English-speaking people to the principles of the historical development of the mother tongue. G. P. K.

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WÜLKER. *Grundriss zur Geschichte der angelsächsischen Litteratur mit einer Übersicht der angelsächsischen Wissenschaft* (Leipzig, 1885), pp. 1–90, gives a sketch of the history of Anglo-Saxon studies. This should be supplemented by the preface to Liebermann's *Die Gesetze der Angelsachsen* (Halle, 1903), and by *The Dictionary of National Biography* under the proper names mentioned above. The arguments for the introduction of Anglo-Saxon into the curriculum of secondary schools are favorably presented in Carpenter, Baker, and Scott, *The Teaching of English*, pp. 215–218.

ANGLO-SAXON SCHOOLS. — A certain school of historians, the first of whom was William of Malmesbury in the twelfth century, anxious to show that the Normans had not merely by superior numbers conquered a people superior to them in the arts of civilization, have written down the Anglo-Saxons as a beer-besodden breed of brainless and bookless barbarians, uncivilized and uneducated. Nothing can be further from the truth. The Anglo-Saxons, from the first moment of their contact with the civilization which still found a home, not in Gaul or France, but in Rome, took a leading part in literature and education, and, in spite of the devastation caused by the Danes, continued to take a leading part until the catastrophe due to the alliance of Danes, Norwegians, Normans, Bretons, and French, which overwhelmed them in 1066. Whether any system of education existed before the Anglo-Saxons espoused Christianity is unknown. The descent of epics like *Beowulf* suggests that some education, founded as in other early races on learning by heart the songs of the nation, existed. But for historical purposes, schools in England began with Christianity. Those of Canterbury, both of grammar and song, which in 631 and 636 formed models for schools at Dunwich and York, according to Bede (*q.v.*), were presumably established by Augustine (*q.v.*), the apostle of the English (see BISHOPS' SCHOOLS), in or about the year 603, when he was allowed to establish a Christian church. Even before the introduction of Greek by the Greek archbishop, Theodore, in 669, the name of Aldhelm (*q.v.*) is sufficient evidence that all the learning of the age could be acquired in the schools of England. For Aldhelm, who was born about 639, could not have obtained his education from Theodore "in infancy," as alleged in one story, supported by a spurious letter, nor at Malmesbury, as alleged by another story, supported by a forged charter, since Malmesbury was then still in the hands of the Britons. A scion of the royal West Saxon house, he must have been brought up at Dorchester, where the West Saxon see was established in 634 by the Roman Birinus and the Frankish Agelbert, who, after studying in Ireland, succeeded Birinus about 650. Bede tells us that Aldhelm had been a deacon under Hoeddi, Bishop of Winchester, and one of the chief evidences of Aldhelm's learning is a letter to Hoeddi, apologizing for not coming to keep Christmas at Winchester with his old companions, because of his studies. He is exploring Roman law to the marrow, is learning to distinguish the one hundred different meters of Latin verse, and is utterly nonplussed by the difficulties of arithmetic, especially fractions, with astronomy and astrology. Aldhelm's treatise on prosody, written to his pupil Acircius, King of Northumbria, is certainly a most learned work, while his Latin verses in Praise of Virginity, borrowings from Vergil and Ovid, and his Riddles in 1000 lines, with their acrostic introduction, *Aldhelmus cecinit millenas versibus odas*, would do no discredit to the scholars of the twelfth or the sixteenth centuries. Some letters purporting to be from foreign scholars seeking to study under him, if genuine, may be no more than complimentary verses. How far he really taught a school may be questioned. He seems to have been rather a student than a teacher, while he was a monk, and when he became Bishop of Sherborne in 705, his letter to Gerontius and other works are those of a divine rather than a master. But one and all testify to the existence of a learned literary coterie and to excellent schools, while the well-known story of his English songs by which he attracted careless folk to church shows that he was no mere peasant. The correspondence of Winfrith of Nursling, Hants, who changed his name to Boniface, when he exported himself about 715 to become the apostle of Germany and Archbishop of Maintz, with eight bishops under him, all Englishmen, and his successor, Lull, in 755, gives a most pleasing picture of English learning. It shows that women shared almost equally with men in the intellectual life. Egburg, who may be the same person with Eadburgh, Abbess of St. Mildred's, Thanet, reminds him how she and her brother had been his pupils together. Eangyth, Henburg, Bugge, Cuneburg, and Leobgyth, who followed Boniface to Germany, and Vieune, Abbess of Bischoffsheim, exchange letters with him and his clerks in excellent Latin, adorned with scraps of Vergil and other classic authors as well as of the Scriptures. They give and ask for presents, chiefly of books and manuscripts, especially Bede's and Aldhelm's, and on one occasion Boniface asks Eadburgh to write him a copy of St. Peter's Epistles in letters of gold. They send and are sent Latin verses of their own composition, a feat which the nuns of the twelfth and later centuries would have found quite beyond them. Boniface refers to Winbert, abbot of Nutselling, as having been his master and teacher, and when archbishop still continued to teach himself. In writing to an Englishman, Aud, whom he had made an abbot in 735, he modestly expresses his gratification at Aud's gratitude for his teaching, as, though he had but little learning, he was at least a devoted teacher. Another of his pupils whom he had sent to Thuringia, addressing him as "his most devoted instructor in the study of grammar" (*in litterarum studiis*) asks leave to stay away a little longer and incloses some verses to be corrected by Boniface. The schoolmaster appears too in the incident of a Bavarian priest, who baptized a person with the formula, *Baptizo te in nomine patria et filia et spiritus sancti*. Boniface was so shocked that he had the person rebaptized. The Pope, less pedantic, held that as long as the three persons of the Trinity were named, even in bad grammar, the baptism was good.

It was in Northumbria that schools flourished most. The great name of Bede, one of the greatest among the encyclopedic writers of the Middle Ages, is sufficient testimony to the English teaching. Though he was a pupil from the earliest age in a monastery, and taught in a monastery probably only young monks, yet the monasteries and the monastic schools of those times were much more like public schools than those of later ages. In the twin monasteries of Jarrow and Wearmouth there were no less than 600 monks instead of the 60 which was the maximum of the largest monasteries in post-Conquest times. Besides the *Ecclesiastical History*, which will forever preserve his name as that of the sanest and greatest historian for 500 years, his works are the works of a schoolmaster of no mean order. Contemporary with him, we have Egbert in 732, the bishop and teacher of York School, followed by Ethelbert, or Albert, *c.* 766 (*q.v.*), Alcuin's master, on whose merits as a schoolmaster Alcuin descants at length. He taught everything — grammar, rhetoric, law, physics, and divinity, to say nothing of arithmetic, geometry, and the mode of calculating Easter, music, and singing. Alcuin himself succeeded him as master of the Cathedral School of York, with the same extensive curriculum which he took to France, when, in 780, he became the master of Charlemagne's Palace School. His correspondence with his old friends at York shows an active interest in education. He sends a master to teach the new school which King Offa of Mercia was setting up, presumably at Lichfield, and proves that schools were no new thing in Mercia by regretting that the light of learning was now extinguished in many places in Offa's kingdom. Other letters show his interest in the schools at Canterbury and Hexham, and he seeks to borrow books from York for the school he afterwards set up at Tours, because no such treasures were to be found in France.

During the Danish invasion, when Winchester was " to-broke " in 860 and the Hampshire thanes fled oversea, learning suffered. It is to this period that the famous complaint of Alfred (*q.v.*), in the Preface to his translation of Gregory's Pastoral, refers. He contrasts the past, " How zealous the sacred orders had been in teaching and learning when foreigners came here in search of wisdom and learning," with the present, " when we should have to import them, if we would have them. So clean was it fallen off among the English that there were very few on this side of Humber who could translate a letter from Latin into English, and I believe not many beyond Humber. . . . I cannot remember a single one south of the Thames when I came to the throne." But this was but a temporary setback. They still learned to read English, and so Alfred made his own translations. He determined that " all the youth of our English freemen, who are rich enough, should be set to learning until they are able to read English, and those afterwards learn Latin who wish to continue in learning." He set the example in his own family, if the pseudo-Asser, his eleventh-century biographer, is to be trusted, for his eldest son and daughter, brought up in the court, learned to read English books, and especially Saxon poems, while " Ethelward the youngest was sent to the Grammar School there, with the children of all the nobility of the country and many also who were not noble. Books in both Latin and Saxon were diligently read in the school. They also had leisure for writing." The pseudo-Asser then depicts the older generation envying the younger, because the latter were learned and they were not.

In the next generation King Edgar's canons, attributed to the year 960, directed that no priest should take another's scholar without his leave, and that learned priests should not put the half-learned to shame. Ælfric's (*q.v.*) grammar and his famous colloquies at the beginning of the next century, *c.* 1005, the Latin interlined with an Anglo-Saxon translation, are the earliest schoolbooks of purely English origin that has come down to us, for Alcuin's were written abroad. He was himself educated at Winchester; where he taught is not known. His book was edited and added to by his pupil Ælfric Bata. The Anglo-Saxon document known as *Ranks*, vaguely attributed to " *c.* 1029 to 1060," gives evidence of the wide spread of learning, by laying down that the scholar who had become proficient in learning so as to reach sacred orders, was treated as a free man and ranked according to his orders. The Archdeacon of Bury St. Edmunds, writing in 1070, attributes to the Danish king, Canute, an extensive system of free scholarships to public schools at his own expense. The account of Waltham Holy Cross Church of secular canons, founded by Earl Harold in 1060, brings the tale of English schools up to the date of the Conquest. With the two clerks installed by Tovi le Prude in Waltham, the strenuous earl associated eleven other wise, prudent, lettered men, carefully chosen from the best of the land, among whom was a certain Teuton unexpectedly bestowed on him by God's gift, Athelard, by birth of Liège and by education of Utrecht, while Wulwin, whom the earl set over them as Dean, was illustrious in character and industrious in learning. The historian himself was taught by Master Peter, the son of Master Athelard; " from whom flowed a copious stream of learning, after the Teutonic fashion, for the composition of letters and verses did not diminish the learning and practice of singing. And so far did their rule differentiate the boys from ordinary boys that they walked, stood, read, and chanted by heart with as great gravity as if they were monks. Whether they were in choir, or marching in procession from school, they go to choir and from choir to school as if they were regular canons getting up to midnight matins." Lastly, when King Henry I wished to prevent the new Norman lord of Warwick from upsetting the constitution of the mother church in favor of a new church, his writ confirmed to the Church of All Saints the school of Warwick as it was in the days of Edward the Confessor. A. F. L.

See ALCUIN; ALFRED; ANGLO-NORMAN DIALECT and SCHOOLBOOKS; BEDE.

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ANHALT, DUCHY OF, EDUCATION IN. — See German Empire, Education in.

ANIMAL PSYCHOLOGY. — Our natural impulse when we watch the behavior of the lower animals is to interpret that behavior as if it were accompanied by thoughts and emotions like those of human beings. Not only do animals seem more interesting to the ordinary observer if they are thus humanized, but even such writers as Darwin and Romanes have wished to prove that the animal and the human mind are very similar, their aim being to show that in the course of evolution no sharp break has intervened between the highest development of animal intelligence and the appearance of human intellect. While the supposed facts of animal behavior were being collected merely by chance observations and anecdotes of remarkable animal actions, little restraint of this humanizing tendency was possible; but with the application of the *experimental method* to the study of such behavior, an opposite tendency arose. The earliest formal experiments in this field were made by physiologists rather than psychologists, and this fact, together with the scientific caution naturally accompanying exact experimentation, led to the view that even the simplest forms of consciousness in the lower animals must not be assumed to exist unless such an assumption is absolutely necessary. Loeb in 1888 undertook to show that when an animal seeks or avoids a certain stimulus its action is as fatally determined by the stimulus as the attraction of iron by a magnet or the growth of a plant by light. The movement of the animal is a "tropism," its direction determined by the fact that the animal is forced by the action of the stimulus to take up a position where symmetrical points on opposite sides of its body will be equally stimulated. Thus the animal does not move toward the stimulus because it "likes" it, but because its body is forced into such a position that it can move in no other way. Following Loeb, other physiologists, such as Beth, hold that the behavior of all invertebrate animals at least can be explained on the supposition that they are entirely unconscious, and maintain that it is really impossible to know anything about the mind of the lower animals in general. Thus animal psychology has, on this view, no claim to be regarded as a science. It is true that the human interpretation of animal behavior must be abandoned. Careful study of such behavior reveals its many points of difference from human conduct, and the unlike bodily structure, especially sense-organ structure, of the lower animals and man makes it certain that the animal mind must be unlike the human mind. On the other hand, to argue that we can know nothing of the animal mind because we can never observe it directly, is to attack the basis upon which human psychology itself rests, for we can have only an indirect and inferential knowledge of other human minds. Loeb suggested that we should infer the presence of mind in an animal only when its response to a stimulus shows the influence of a former stimulus which occurred together with the one now acting: this phenomenon he called "associative memory." In one form or another such an *influence of the animal's past individual experience* has been taken by various authorities as proof of mind. But this influence exists in so many degrees, especially as regards the rapidity with which an animal is affected by it, that its practical value as a criterion is small; and moreover its absence does not prove that an animal is mindless. On the whole, we may say that the existence of mind in the higher animals is nearly as probable as its existence in our fellow men; that there is no point in the animal kingdom below which we can assert that it does not exist; but that our inferences regarding its nature must be carefully guarded.

Assuming consciousness in the lower animals, there are two principal ways in which we may infer that a given stimulus produces a specific sensation in the animal mind: first, if the animal reacts to that stimulus in a manner different from its mode of reacting to other stimuli, and second, if it possesses a special sense structure without which reaction does not occur. These two lines of evidence reveal the following facts about the senses of the lower animals. The earliest sense to be differentiated from sensibility to mechanical contact is probably the food sense, by which edible and nonedible substances are distinguished. The sense of smell, descended from the food sense, attains high development in certain animals: (1), in the mating of insects it appears to be responsive to stimuli through a great distance; (2) many animals, the ant and the dog for instance, seem able to analyze complex smells as human beings cannot; (3) in insects, whose smell organs are the movable antennæ, smell may be a spatial sense giving rise to perceptions of form and size. Of hearing there is little evidence in invertebrate animals; structures which were formerly regarded as auditory organs are now thought to be concerned with preserving the balance of the body. Authorities differ with regard to the existence of hearing even in fish. An important problem concerning the sense of sight touches the existence in an animal of true color discrimination. If an animal apparently distinguishes colors, it may do so as a totally color-blind person does; that is, the colors may be seen as different shades of gray. When, to disprove this supposition, we substitute for the colors the grays that a totally color-blind person sees in their place, and show that the animal cannot discriminate these, there still remains the possibility that the animal may be color-blind, but may see in place of colors grays different from and more readily distinguishable than those seen by a color-blind human being. For instance, there is evidence that red is much darker to some animals than it is to human beings. The formation of a visual image seems to be dependent on the possession either of an eye with a lens, or of the compound eye found in arthropods. A recent experimental test of the presence of an image has subjected various animals to the action of two sources of light of equal intensity but unequal area: if an animal that naturally seeks light goes toward the source having greater area, it is concluded that the area is perceived as such.

The most interesting question in animal psychology is that regarding animal *methods of learning.* Broadly speaking, when a human being's conduct is modified by his past experience, this experience may function in either of two ways. The person may behave differently toward a present stimulus because of previous experience with it, as when we recognize a foreign word on hearing it. Or a memory image of a previously experienced stimulus may be suggested when the stimulus is not actually present, as when we recall a foreign word mentally. That animals learn in the first sense, with varying degrees of rapidity, there is much evidence: they learn to choose stimuli with which presumably pleasant experiences have been associated, to work simple mechanisms by which they may obtain food or release from confinement, and to traverse certain paths leading in a similar way to "desirable" results. But there are reasons for thinking that animals rarely show the second kind of learning, involving the revival of a memory idea of an absent object. For instance, (1) they often learn a movement very slowly, only gradually ceasing to perform many superfluous movements, and at no point seeming to "get the idea" of the right movement; (2) only in the case of monkeys is there good evidence that they *imitate* each other except in a blind, instinctive fashion: an animal that does not know how to get out of a box by working a mechanism is not helped by watching another animal perform the trick; (3) instinctive behavior that would in human beings be accompanied by ideas seems not to be so accompanied in animals, as when a wasp in feeding larvæ bites off a piece of a larva's body and offers it to the same larva as food. On the other hand, the rapid learning of certain higher vertebrates, monkeys and raccoons, for example, makes it possible that they may possess memory ideas, although in far less measure than human beings. If it is thus doubtful whether the lower animals have the power to form ideas at all, it is evident that they can make no use of abstract or general ideas in the human sense of those terms, and that their "reasoning" processes must be rudimentary. The absence of language is in itself a sufficient obstacle to the development of abstract thought. In the same way the emotional life of animals must be influenced by the limited function of ideas in their consciousness. While the fundamental human emotions, individual and social, are represented in the animal mind, they are necessarily profoundly modified by the inability of their possessors to reflect freely on the past and forecast clearly the future. M. F. W.

The influence of animal psychology on the scientific study of educational processes has been large. First, the study of animals has concentrated attention on the fact that there are different methods of learning, and the student of human education has seen the importance of distinguishing between these different types of learning and the methods of cultivating them. Second, it has appeared with all clearness that ideas and all adaptations dependent on ideas are distinctly human. The relation of human education to such natural activities as play, and to instinctive forms of behavior, is clearly understood only when the general relation is clearly defined between activities accompanied by ideas, and activities independent of ideas. Third, animal psychology has furnished a field of experimentation in which methods of studying mental development have been refined, and these methods have been suggestive to students of human mental development.

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ANIMALS AND PLANTS, INSTRUCTION CONCERNING CARE OF. — See Humane Education and Nature Study.

ANIMISM. — See Primitive Education.

ANNA SOPHIA (1584–1652). — Wife of Count Karl Günther von Schwarzburg-Rudolstadt. A great friend of education, she aided and protected Ratke, from whom she took instruction in Latin and Hebrew.

ANNISTON NORMAL, INDUSTRIAL, AND THEOLOGICAL COLLEGE, ANNISTON, ALA. — An institution for the education of colored boys and girls, founded in 1897 by the present president, Augustus A. Battle. The aim of the institution is, however, to develop instruction on the industrial side. The normal course follows the eight years of elementary work. There is a four years' college preparatory course. A three years' course of study is offered for ministers.

ANSCHAUUNG. — A German term meaning direct, concrete observation. It has been very frequently used in describing concrete instruction (*Anschauungsunterricht*), that is, instruction based upon objects which can be directly perceived by the student. The word has sometimes been translated by the English word "intuition." This, however, is misleading, for intuition as commonly used refers to some unusual insight on the part of the individual.

ANSELM. — Father of scholasticism and Archbishop of Canterbury; born in Piedmont in 1033 and died at Canterbury, England, in 1109. For the purposes of this work it is not the ecclesiastical-political activities which he was compelled against his will to undertake that are significant so much as his labors as a writer and scholar. He entered the monastery of Bec, where he succeeded the eminent Lanfranc as prior and afterwards became abbot. Bec, already famous, became under Anselm the principal center of learning in western Europe. Here he wrote his works on *Truth*, *The Grammarian*, the *Freedom of the Will*, the *Monologion* and the *Proslogion*. Driven from England, where William Rufus had in a moment of penitence appointed him to the long-vacant see of Canterbury, he wrote his theological work *Cur Deus homo*. Anselm boldly appealed to reason to establish the Christian theology, founded the medieval realism (*q.v.*) about which so many scholastic controversies were afterwards centered, elaborated the doctrine of the Trinity, and stimulated the fruitful opposition of the nominalist Roscellin and the conceptualist Abélard (*q.v.*). The vigor and lucidity of his arguments not only stimulated his contemporaries, but affected the whole subsequent development of philosophy and Christian theology. P. R. C.

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ANTHON, CHARLES (1797–1867). — The author of more than fifty Latin and Greek texts for secondary schools and colleges; educated in private schools and at Columbia College; rector of a grammar school; instructor and professor of ancient languages in Columbia College (1830–1867). W. S. M.

ANTHROPOLOGY. — The science of anthropology deals with the characteristics of man as a member of social groups. At the present time the science is treated from three fundamental points of view, — the biological, ethnological, and linguistic. Biological anthropology deals with the anatomy and physiology of the body of man as found in different races and in different social groups of the same race. Ethnology deals principally with the customs, institutions, and beliefs of primitive people, while the treatment of more advanced groups is generally left to the study of history and sociology. The linguistic aspect of anthropology deals with the unwritten languages of primitive people. To these branches must be added the subject of prehistoric archæology, which, however, is closely related to the study of somatology and of ethnology in the same way as paleontology is related to the study of living beings. The object of anthropological study is the elucidation of biological and psychological laws governing the development of mankind, and the reconstruction of the prehistoric history of civilization.

The development of anthropology is quite recent, and consequently the subject was introduced into the curriculum of colleges and universities at a late date. It appears from the description of the field of anthropology given here, that the affiliations of the subject are manifold. Physical anthropology is closely related to biological subjects, and, owing to the social aspect, from which anatomical and physiological questions are treated, its affiliations with medicine, particularly with hygiene and with education, are marked. The study of ethnology is closely related with subjects like psychology and philosophy, and is even to a certain extent coterminous with sociology. It also has very close relations to the study of the history of civilization. Linguistic studies are intimately related to the philological departments of knowledge and to the history of literature. Owing to these manifold aspects of the science of anthropology, the teaching of the subject has been taken up from different points of view, according to the peculiar conditions of the institution where it was introduced.

The first American institutions in which systematic instruction in anthropology was introduced were Harvard University and Clark University, in 1888 and 1889. In Harvard University, instruction in anthropology was originally primarily archæological and somatological, because it developed from the work of the Peabody Museum of American Archæology, and was based on the collections contained in that museum. In Clark University, anthropology was introduced as a branch of psychology, and consequently particular stress was laid upon the somatological differences of various races as a basis of the study of mental processes, and upon the psychological aspects of ethnological problems. In Yale University Professor Sumner developed anthropological studies from the point of view of sociology as an outgrowth of the Department of Political and Social Science; the first course was given in 1885–1886. The development in Columbia University in New York is also characteristic of the different lines of approach from which the modern study of anthropology develops. Ethnology was first introduced at that institution in 1893, in the Department of Psychology. About the same time special courses on the development of the races of Europe were established in the Faculty of Political Science, while in 1896 physical anthropology was introduced in the Faculty of Pure Science. In 1902 anthropology had developed in American universities in such a way that, of 31 universities and colleges offering more or less systematic courses in anthropology, it was affiliated with sociology in 9, with philosophy in 5, with psychology in 3, with geology and zoölogy in 5, with medicine in 1 institution. In 8 institutions anthropology was given without special affiliations with other subjects.

Anthropology as a University Study. — As a university study, anthropological departments aim to train expert students of anthropological science. Up to the present time there is not a single university in which the subject is taught adequately in its entirety, but different aspects — according to the interests of the representatives of the department — are given decided preference. Thus in Harvard University, American archæology is given decided preference over other subjects; while in Columbia University, American ethnology and linguistics are treated more frequently than other subjects. The close affiliation of the Harvard department with the Peabody Museum also brings it about that material culture is treated with great intensity, while the separation of the American Museum of Natural History of New York from Columbia University brings it about that psychological questions are given greater prominence. Close affiliations between museums and universities or colleges exist in Harvard University, Yale University, University of Pennsylvania, and the University of California, to a lesser extent in the University of Chicago. In Columbia University and in the University of Chicago there is no formal relation between the large museums of these cities and the universities. Up to the present time graduate work in anthropology is carried on particularly at Columbia University and Harvard University, to a less extent in the University of Chicago and in the University of California, while less extended graduate work is done in a number of other institutions.

It would seem that the ultimate organization of graduate work in anthropology will necessitate a somewhat different arrangement of these studies than what is found at the present time in any American institution. It seems particularly necessary that the working anthropologist should specialize in one of the three important lines mentioned before, while the two other subjects should be subsidiary to his principal study. The equal preparation for these three branches is particularly difficult, because the methods of approach of physical anthropology and of linguistics are so entirely distinct, and seem to attract quite different types of mind. Somatology deals, on the whole, with small differences between different types of man, and requires, for this reason, the application of refined biometrical methods, which are based on the study of biology and of mathematics. Linguistics, on the other hand, requires a thorough philological training such as at present can be attained only in departments dealing with Indo-European languages. It appears, therefore, that for teaching purposes the biological aspect of anthropology should be associated with biological departments; that the linguistic study should be associated with philological departments; while the anthropological department, properly speaking, should devote most of its energies to the study of ethnology. Obviously a rigid classification of a science which occupies so extensive a borderland between a great variety of sciences will never be possible; but the peculiar character of anthropology at any university will always depend upon the particular interests and methods of the instructors.

Modern development of a number of sciences indicates very clearly that anthropological methods may be applied to advantage in many problems, and this will lead increasingly to a demand for anthropological instruction, which will give the student a grasp of certain kinds of anthropological methods. Thus the hygiene of childhood leads to numerous questions, which can be solved only by anthropometrical methods, and which must be approached with a knowledge of the application of anthropology and sociology. (See article on GROWTH.) In a similar way the study of the early development of civilization brings out even more clearly the great importance of the psychological problems of anthropology as well as the results of inquiries into prehistoric archæology. The future development of anthropology as a university study will have to serve not only the purpose of training the anthropologist, but also of giving opportunity to students of other sciences to acquire a knowledge of anthropological methods, so far as these may be required by them.

Anthropology as a College Study. — Many American colleges have introduced full courses or partial courses in anthropology. The general tendency seems to be to utilize the subject matter of anthropology to develop the idea of the evolution of modern society from primitive forms. These courses are generally elective, and their correlation with other subjects is not very intimate. It would seem that the general function of a course in anthropology would be to give to the student a wider view of history than can be obtained from a consideration of the later history of the European race alone, and that a true appreciation of the significance of the achievements of our civilization in relation to the achievements of other races can be attained. The essential difficulty in the effective use of anthropology for these purposes lies in the fact that the college student can hardly be led beyond the most general facts of this science, and that consequently the concentration of his attention upon the subject is inadequate. It might seem that the method which has been developed in a number of institutions, of utilizing anthropology as an introduction to semi-historical courses, is more promising; but it is certainly necessary that the affiliations between this subject and other related subjects should be made closer than they are at the present time.

Elementary and Secondary Schools. — More or less successful attempts have been made during the last fifteen years to utilize the results of anthropology for the purposes of elementary and secondary education. For some time much stress has been laid upon the theory of recapitulation (see CULTURE EPOCH), according to which the development of the child should follow in a way the general evolution of civilization; so that the occupations of the young child should be similar to the manifestations of life among primitive people, while with increasing age the complexity of occupations should increase in a way comparable to the development of culture. I believe this point of view has been essentially discarded, while at the same time the inclination remains of utilizing anthropological material in the early stages of manual training and also in connection with the teaching of geography, history, and literature. In secondary schools the attempt has been made to develop the foundation of history on an anthropological basis; and there seems little doubt that a much broader view of the development of society can be attained by paying attention to the earliest history of invention, to the contributions made to our civilization by different races, and to the contributions of man and woman to the advance of civilization. F. B.

ANTHROPOMETRY. — See GROWTH.

ANTHROPOTOXIN (*ἄνθρωπος*, man, and *τοξικόν*, poison). — A term used by the older German investigators to indicate the poison supposed to exist in expired air. Recent investigations by Bergey fail to find positive proof of any volatile organic poison in expired air, and indicate that the bad effects due to unventilated rooms are chiefly caused by the extreme heat, unfavorable conditions of humidity, and perhaps the bad odors, and several other factors, a view corroborated more recently by the investigations of Paul in Breslau. W. H. B.

See AIR OF THE SCHOOLROOM; CARBON DIOXIDE; HEATING AND VENTILATION.

ANTIOCH, THE SCHOOL OF. — Antioch was founded not long after 300 B.C., and even in pre-Christian times was celebrated as a center of intellectual life. In the fourth century A.D. it was the third city in importance in the world, and the first of the Roman Empire in the East, and was a famous seat of sophistical, or oratorical, study. The most of our information about the School of Antioch is obtained from Libanius, who was a native of the city, a teacher there from 354 to the year of his death, 394, and one of the most famous sophists (*i.e.* teachers of oratory) of his time.

There seems to have been at Antioch in the fourth century A.D. a fairly well organized school system. The school (called a *χορός*, *chorus*) of which Libanius was the head comprised, besides himself, four "rhetors" (seemingly teachers of the more elementary or technical side of oratory) and at least one "grammarian," as well as, probably, at one time a teacher of Latin and a teacher of law. Each of these, as well as Libanius himself, was in receipt of an official salary (which in the case of the under teachers was paid by the council, and in the case of Libanius came partly from Antioch and partly from Phœnicia), and they received their appointment from the local council; Libanius's position was an imperial endowment, as is shown by the fact that part of his salary came from outside the city. That there were other schools of the sort at Antioch is probable; possibly, however, this was the only rhetorical school the members of which received their appointment from, and were paid by, the state. There may have been a school of philosophers, as there was in the neighboring town of Apamea, and there were probably some private schools with fewer instructors. It is certain that there were other official sophists at Antioch, but whether they were the Heads of schools similar to the school of Libanius is not known. Two of these official sophists probably occupied chairs which were imperially endowed.

Apart from the schools, there were other, individual, teachers of various grades, who had no official appointment. All these, together with the schools above mentioned, constituted what may be called the School of Antioch, and of this school — not simply of his own corps of rhetors — Libanius was head. The full details of his official relation to the various schools and teachers cannot be made out with definiteness. He seems to have had some general oversight of matters pertaining to the teachers and schools of the city, subject to the direction of the municipal council and the Emperor, and he acted as the mouthpiece of council and teachers in their dealings with each other. He sometimes selected teachers to receive appointment from the city, and his influence was sufficient to secure at times an increase of salary for a teacher. By virtue of his position as head of the School of Antioch Libanius was called " The Sophist of Antioch."

The center of university life at Antioch seems to have been the Museum, but Libanius and his corps of teachers had rooms in the senate house. The schools of Antioch in the fourth century drew students from all parts of Asia. As the fourth century wore on, and law and Latin usurped in the popular favor the place of Greek, chairs of these subjects were established at Antioch. We know little about the school in the fifth century, but there is no doubt that rhetorical studies declined at Antioch then, as they did throughout the eastern part of the empire. J. W. H. W.

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ANTIOCH COLLEGE, YELLOW SPRINGS, OHIO. — Founded in 1852, with Horace Mann as first president. The college is nonsectarian and coeducational. The institution has had some of the most notable American educators on the faculty at one time or another. The four college buildings are situated on a picturesque campus, twenty acres in extent. For an institution of its standing Antioch furnishes an education at a very cheap rate, students' expenses averaging about $150 a year. Preparatory, college, engineering, normal, summer school, and music departments are maintained. Admission is by certificate from an accredited high school or by an examination requiring fifteen units. Degrees are given in classical and scientific courses. The course in civil engineering may be completed in two years or taken as part of the college course. The value of the plant is about $145,000, the productive endowment is $105,000, and annual income about $6500. There are 8 professors, 1 associate professor, and 4 instructors in the faculty. S. D. Fess, LL.D., is the president.

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APHASIA. — A difficulty or an inability, due to cerebral disease, (1) to understand one or more of the forms of expressing ideas, and (2) to produce the appropriate movements for idea expression, in an individual who had been able to understand and to express his ideas. It will be seen that this definition does not include the inability of the idiot to express ideas or to understand them, nor does it include the inability of the uneducated to understand certain forms of expression, *e.g.* printing, writing, etc., or their inability to express ideas in all the ways in which an educated individual may.

In 1861 Broca reported the condition of the brain of a patient that had been unable to express himself by means of vocal speech, and showed that the left hemisphere had been diseased anteriorly, especially in the third frontal convolution. This report and the reports of subsequent similar studies soon led to the general adoption of the belief that the left third frontal convolution of the cerebrum is the seat or the center for motor speech. At later dates Wernicke described the clinical form of aphasia in which the individual is unable to understand what is said to him, and Kussmaul that in which there is an inability to understand the meaning of written and printed words. Since these early studies many different kinds of aphasia have been described and the anatomical localizations are as numerous as the forms.

Certain varieties of aphasia have been briefly mentioned above: *motor aphasia,* the inability to elicit the coördinated movements of the vocal apparatus necessary for the production of sounds that have idea meanings; *word deafness,* or *sensory aphasia,* the absence of or the deficiency in the ability to associate sounds with ideas; and *verbal blindness,* or *alexia* (*q.v.*), the loss of the power to read understandingly what is written or printed. In addition to these more frequent forms, the following aphasic conditions have been described: *agraphia* (*q.v.*), the loss of the ability to express one's ideas in writing; *amusia* (*q.v.*), the loss of the ability to understand music as such; *asymbolia,* or *asymboly* (*q.v.*), the defect or inability of production or of understanding of movements expressing ideas, *e.g.* gesture; *apraxia* (*q.v.*), the inability to appreciate the forms of objects and to properly use them; *paraphasia* or *jargon aphasia,* the use of wrong words or of nonsense sounds for the expression of ideas. *Agnosia* has at times been used as a synonym of sensory aphasia; *anarthria, aphemia* (*q.v.*), and *aphonia* (*q.v.*) are sometimes used for motor aphasia; and *asemia* has at times been employed as a synonym of aphasia (general).

The symptoms in the more commonly observed types of aphasia are grouped in the accompanying table, and there are added the quite generally admitted cerebral localizations corresponding to the different types of this disorder. From this table it will be seen there are well-marked differences in speech ability associated with disease or destruction of different parts

TABLE OF SYMPTOMS IN DIFFERENT FORMS OF APHASIA

(Combined from Various Sources)

Clinical Varieties	Cerebral Localizations		Forms of Speech Associations Retained						
			Understanding of spoken words	Understanding of printed and written words	Ability to repeat spoken words	Ability to write from copy	Ability to write from dictation	Ability to read aloud	Voluntary (*i.e. motor*) speech
Word deafness	Posterior two thirds of 1 and 2 Temp.	cortical	no	yes	no	yes	no	no	yes
		subcortical	no	yes	no	yes	no	no	poor
Motor	Foot of 3 Frontal	cortical	yes	yes	no	yes	yes	no	no
		subcortical	yes	yes	no	poor	poor	no	no
Visual (alexia)	Angular gyrus	cortical	yes	no	yes	yes	no	no	yes
		subcortical	yes	no	yes	poor	poor	no	yes
Agraphia	2 Frontal	cortical	yes	yes	yes	no	no	yes	yes
		subcortical	yes	yes	yes	poor	poor	yes	yes
Paraphasia, etc.	Between T. and O.	subcortical	poor	poor	yes	yes	no	yes	yes
	Between T. and F. (Island of Reil)	subcortical	poor	yes	no	yes	no	yes	no

of the cerebral cortex or of the underlying association fibers. It should be noted, however, that in most, if not in all, cases of aphasia the speech disorder is not so simple as might be inferred from the preceding paragraphs and from the table. It seems likely that simple cases are the exception and that careful inquiry will disclose a combination of defects, showing a marked diminution in one or two of the normal speech abilities (sensory or motor). [At this point it is well to mention that a certain school of neurologists (led by P. Marie) denies the existence of special forms of aphasia and of separate cerebral localizations for different speech abilities, and it attempts to explain all such cases on the basis of a dementia. (For this point of view see the work of Moutier given in the bibliography below.) The value of this destructive work of Marie and of his pupils appears to be largely a critical one, in that it calls attention to the inadequacy of previous psychological and anatomical observations.]

The history of the aphasia doctrine is an excellent example of the popular method of psychologizing, for apparently it has been tacitly assumed that the analysis of mental symptoms is extremely simple. At first the speech association mechanism was divided into sensory and motor, and at the present time this division is still deemed satisfactory by some. Later each of these general forms was subdivided into two; the sensory into visual and auditory, and the motor into vocal and writing. That on the psychological side such a division does not represent the facts is evident when an analysis of speech function is undertaken. The ways in which ideas may be conveyed are greater than four, and it requires no great analytical skill to show that a dozen does not exhaust the probabilities. In any individual who is suspected of an acquired speech defect the following is the minimum of conditions that should be investigated to demonstrate a definite disturbance of the speech mechanism: —

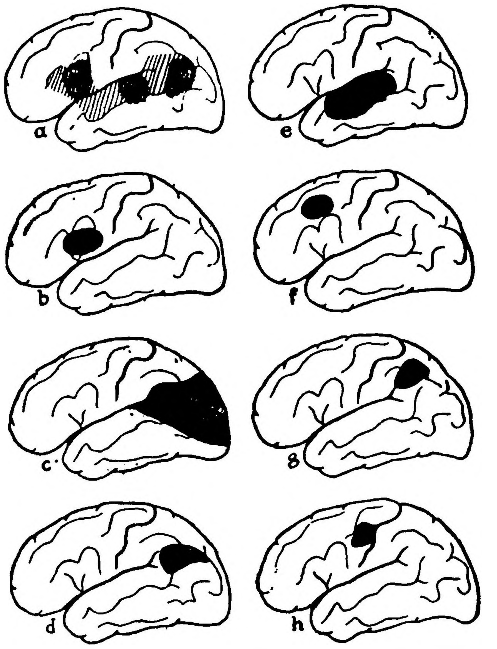
(1) Voluntary speech, the ability of the individual to make his wants known, to carry on a conversation, etc.; (2) reading aloud printed and written words, that there may be obtained an idea of the ability to associate visual and motor; (3) reading (not necessarily aloud) printed and written words and indicating by actions (speech or by arms, legs, etc.) that the sensations were understood or appreciated; (4) writing from copy (connection between visual and motor); (5) writing from dictation (connection between auditory and motor); (6) writing spontaneously; (7) repeating words that are spoken (connection between auditory and motor); (8) understanding of spoken language, as shown by the ability of the individual to respond in an appropriate manner; (9) recognition of objects and their use, as indicated by the ability of the patient to take an object in the hand, for example, or to look at it, etc., and to show by action how the particular object is to be used; (10) naming of objects; (11) association of name that is seen or heard with an object that is sensed through visual, auditory, tactual, olfactory, gustatory, or the so-called stereognostic senses.

Any one of these speech associations may be wanting, and there are many possible combinations of disorders, as has been indicated above. The combined disorders are, as has been said, most common, and, possibly, the sole clinical forms. For discussion, however, we shall assume the occurrence of the simple types and give their anatomical correlates. The description of the anatomical localization of speech functions may well be introduced by a brief general consideration of the relation of the nervous system to mental states.

Neurologists, physiologists, and most psychologists assume for the cerebrum a multiplicity of function, with the capacity for unification. All the functions that the cerebrum has may, for convenience, be classed as sensory, motor, and associational. (See for full detail the article on the Nervous System, especially that dealing with the cerebrum.) All of these functions are mediated through the cerebral cortex and the connecting fibers or through the collections of cells in certain places, which collections are called basal ganglia. The collection of cells making up the basal ganglia may for present purposes be disregarded. We may say that any definite collection of cortical cells or of fibers differs in function from all other collections, although all are cross-connected and in the most intimate anatomical and functional relation. This is the general ground from which all the anatomical localizations of speech functions arise.

On the psychological side, the aspects of speech are sensory, motor, and associational. These three groups may be further subdivided into: sensory — visual, auditory, gustatory, tactual, olfactory, etc.; motor — vocal speech, writing, gesture, the production of print or of other symbols, etc.; and association — the connection between any two or more of the sensory and motor elements. Each of these arbitrarily divided elements is conceived to have a seat or to have its center in some part of the cerebrum (similarly arbitrarily divided). The normal speech function persists only so long as the separate brain areas are intact and the connections unbroken. If any area becomes diseased by reason of hemorrhage, the choking of an artery, or from any other kind of injury, certain functions will be interfered with, but it will be possible to have certain other functions carried on in a normal manner. Thus it is with the speech centers and their connections. If the centers be affected certain definite functions will be lost or impaired, and if the association tracts are interfered with, there will be losses of speech, but of different kinds to the losses observed after destruction of the cortical areas, because the connections have been broken rather than the storehouses. Lesions of appropriate portions of the cerebrum may result, therefore, in a number of different kinds of aphasia, simple or complex, depending upon the location of the injury and upon the number of "centers" or "connections" involved. The foregoing table gives the symptoms in ten of the rather simple uncomplicated aphasias, and it is possible from this table to reconstruct others in which the combinations of aphasias are represented.

The cerebral localizations of the simple aphasias are noted in the table, and some of them are shown in the accompanying diagram. In addition, there are given the location of certain lesions not productive of aphasic conditions. It will be noticed that the so-called motor aphasias (vocal and writing) are due to lesions of the frontal lobe on the left side, close to the centers for the movement of the right hand, arm, and face, and that the so-called sensory aphasia centers border upon the sensory areas in the posterior portion of the hemisphere. The subcortical aphasias cannot be represented on this diagram, but the location of the lesions causing these conditions may be made fairly well if the motor speech centers are connected by lines with the sensory areas, and lesions supposed to exist at some portion of the lines which are drawn. It will be noticed that many of the lines approach the part of the cerebrum called the Island of Reil, and in this region we do, in fact, find many lesions causing aphasias of the subcortical varieties.



Illustrating the localization of cortical brain lesions productive of aphasias and other defects. (*a*) The general localization of the speech centers, according to Dejerine. The cross-hatched portions are those most intimately concerned with the speech functions. (*b*) Localization of a blood clot that produced a simple motor aphasia (Hotchkiss). (*c*) Lesion of cortex, productive of psychical blindness. (*d*) Anatomical localization of a lesion in a case of alexia (Pick). (*e*) Cortical destruction, productive of word-deafness (Wernicke). (*f*) Localization of cyst, causing spasm of head and eyes, without aphasia (Starr). (*g*) Lesion causing astereognosis. (*h*) Lesion causing paralysis of hand and arm.

In no case of aphasia due to unilateral cerebral lesion is speech entirely lost; a certain amount of ability to understand, if it be a sensory aphasia, or ability to vocalize, if it be a motor aphasia, remains. It is possible to show that some things are understood or some things are said in a proper manner, and this condition is supposed by some to be due to the fact that the left hemisphere is not entirely the seat of the physiological processes that make up speech ability, but that the right hemisphere takes a part, though rather a minor one. It also is well known that there is great capacity for reëducation of aphasics, and this reëducation has been supposed to take place through the intervention of the right half of the cerebrum. The little careful work that has been published on the process of reëducation indicates that it takes place in the same manner as does the education of an individual not previously trained in this particular.

On the side of education the study of the speech disturbances known under the general term of aphasia is of considerable importance. The analysis of the speech function shows that we use all kinds of sensory impressions to produce a speech reaction, and that if one sensory stimulus does not produce a quick or clear motor result, recourse may be had to impressions through other sensory channels. The aphasic may understand a word if he traces it by hand, even if his eye does not convey to him the impulses that result in apperception or an appreciation. He may also gain an understanding of a situation if he has presented to him a combination of visual and auditory impressions. It is the same with the child. The combination of stimuli, all meaning the same, will produce a result much more quickly and more effectively than any one stimulus, unless there be added to the one stimulus an emotional element lacking in the combination. In certain defectives it is not possible to produce speech associations when the children are approached through only one sensory channel, and all the avenues of approach must be tried simultaneously if good results are to follow. Other important pedagogical suggestions are to be obtained from a consideration of the relation of motor and sensory defects to speech ability, although many of these defects are not properly described as aphasic conditions.

For speech defects due to motor incoördination, see Speech, Defects of. S. I. F.

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APHEMIA. — The inability, or the disturbance in the ability to produce vocal speech. Sometimes used as a synonym of aphasia, but not at present commonly used.

APHONIA. — The inability, partial or complete, to produce the sounds that make what is called speech. The term has been used, but incorrectly so, as a synonym of aphasia (*q.v.*), but is properly applied to all motor speech losses due to any cause, whether in the nervous system or in the peripheral speech mechanism. Paralysis of the vocal cords may cause permanent aphonia, and inflammation may produce a temporary loss. Whispering and hoarseness are called limited aphonias. (See Speech, Defects of.)

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APHRASIA. — The inability to speak, such as that of the feeble-minded and the insane, from defects or deterioration of the intelligence. Sometimes used to describe the aphasic disorder in which an individual has not the ability to connect words so they may make phrases and sentences. (See Aphasia.) S. I. F.

APHTHONIUS OF ANTIOCH. — A rhetorician and sophist who lived about A.D. 314, of whose life no details are known. His place in the history of education is of importance, because he wrote the *Progymnasmata* in Greek. This book illustrates the methods employed by the Romans in teaching boys so as to be prepared for the schools of the rhetoricians. Aphthonius became the favorite textbook, as had been that of Hermogenes. After the Renaissance Aphthonius was rediscovered, and the schools and universities took special delight in using a textbook in rhetoric which had been actually employed in the ancient Roman education. The book, originally designed for elementary pupils, was adopted as a standard authority for older pupils, and the editions through which it ran in the sixteenth and seventeenth centuries in European countries were numerous. The *Editio* *princeps* was in the Aldine *Rhetores Græci*, Venice, 1508, fol. About A.D. 1520 Richard Pynson published in London a translation into Latin, edited by G. Hervet, and in 1582 Henry Marsh issued in London a Latin translation by Rodolph Agricola and J. M. Catanæus. In 1620 Aphthonius' *Progymnasmata* had become the property of the Stationers' Company. The recognized position of Aphthonius in English schools is further shown by John Brinsley, *Ludus Literarius*, 1612, who explicitly states that "the custom in schools," in starting boys on Latin theme-writing, is to "read them some of Aphthonius' rules" and to begin with the models suggested by Aphthonius. This often proved hard for young wits, and one interlocutor in Brinsley's book says the insistence on Aphthonius' methods, involving logic and "moral matters," drove the "scholar to use all devices to leave the school or else caused him to live in a continual horror and hatred of learning, and to account the school not *Ludus Literarius* but *carnificina* or *pistrînum literarium*." Charles Hoole, in the *Master's Method* (1660), defers the use of Aphthonius for the pupil in rhetoric till he reaches the fifth form, when it is to be read in Greek as well as Latin. Aphthonius, like Æsop, wrote fables, and Hoole required fifth-form pupils to translate the fables and themes (from Greek) into pure English and to repeat them (when translated) in both Greek and Latin "that they may gain the method of these kinds of exercise and inure themselves to pronunciation."

F. W.

APOLLONIUS. — One of the greatest teachers of and writers upon mathematics among the Greeks. He was born at Perga, in Pamphylia, about 260 B.C., and died about 200 B.C. He studied in Alexandria, and was very likely connected with the great school there, but very little is known of his life. His great treatise on conics (*q.v.*) was to that subject what Euclid's (*q.v.*) was to elementary geometry. It remained the standard authority in its field until supplanted by the analytic treatment (see ANALYTIC GEOMETRY) invented by Descartes in the seventeenth century. Apollonius also wrote on other branches of geometry and on arithmetic. He was held in such esteem by his contemporaries that he received the name of "Great Geometer."

See also the article on ALEXANDRIA, SCHOOL AND UNIVERSITY OF. D. E. S.

APPARATUS. — The history of school apparatus is necessarily closely associated with the attempt on the part of teachers to accommodate the mind of the learner to the material embodied in the curriculum. Before much thought was given to what material is best suited to the mental development and comprehension of children, and to what information they should be required to compass, the curriculum was largely fashioned to suit the thought life of adults. Naturally, therefore, many things were introduced into school work making unwarranted demands on the intellectual powers of children, and to overcome these difficulties discerning teachers introduced helps in order to objectify and illustrate principles too abstract or intangible for their pupils to comprehend. When reading was taught by the alphabet method, the alphabet wheel, letter blocks, some supposedly significant rhyme, as

Zacheus he,
Did climb a tree,
His Lord to see,

nonsense word lists, or even cakes in the shape of letters, were introduced as means to stimulate the memory and interest of the children. As the word and sentence methods were developed, charts and word frames, with books planned to suit, took the place of alphabet methods. At the present day, blackboards and large sheets or rolls of ordinary wrapping paper, fastened together or on rollers, with well-planned textbooks, furnish teachers sufficient means to teach reading. Anything beyond this is likely to perplex more than aid.

When arithmetic included much that was puzzling and more that premature minds could not grasp, numeral frames, notation and numeration charts, blocks for cube and square root, and various geometrical devices were used to help the pupils along.

In the teaching of astronomy and mathematical geography, tellurians, complicated orreries, globes, and other pieces of apparatus were introduced, and at one time were thought indispensable. All these save globes are now rarely found in our common schools.

The teaching of physiology, which was chiefly anatomy, began in a general way about fifty years ago, and to meet the needs of teachers who knew very little about the subject, gaudily colored manikins and charts were sold in great numbers. Some of these were very ingeniously made, so that by beginning with the outer form of the human body, and continually peeling off layer by layer, the true skin, the muscles, the blood vessels, the lungs, viscera, etc., were exposed in due order. But as soon as teachers came to have any real and true first-hand knowledge of this subject, and could dissect with any degree of skill and had at least some knowledge of comparative anatomy, the use of such apparatus, comparatively speaking, has been greatly reduced.

Naturally the study of the sciences, especially physics and chemistry, has demanded more and more apparatus as the pupils themselves have been increasingly required to learn through doing. But when these subjects were first introduced into the elementary schools, the pieces of apparatus selected (as one may see by referring to lists recommended and on the market fifty years ago) were for the most part those which gave spectacular effects, and upon the use of which the teacher relied for some show of scientific reputation.

The tendency now is to deal objectively and as simply as possible with those physical and chemical properties everywhere in evidence in practical affairs. This reduces reliance on mere experiment, and at the same time turns the attention of the pupil to the significance of the principles illustrated. Furthermore, with the better adaptation of the curriculum to the capacities of children, and to the needs of life, it has been found that such apparatus is often more distracting than helpful. Too much experimentation in the beginning of scientific training may even put children in the attitude of the country boy, who said that he could not see the town for the houses.

The progress of the teaching of physical geography during the last decade or two has been rapid, but the methods used illustrate fairly well the principle enunciated, that as soon as teachers have acquired a thorough knowledge of a subject and practical skill in teaching it, they rely less on apparatus. For example, instead of the cumbersome appliances often found some years ago, designed to illustrate erosion and the carrying power of water, a neighboring stream or gully, after a rain, now suffices. Physical geography is fast becoming an out-of-door study, much to the delight and assistance of the children. Nature is experimenting every day for those who can see. So too with nature study in general. Those who know and can point out nature's methods are inclined to offer no substitutes, which all too frequently hinder rather than help.

On the whole, we use less illustrative material in the way of charts, models, etc., in our elementary schools than is used in corresponding schools in Germany, France, or England. Our books are better printed, and contain a larger amount of illustrative material than is generally found in the textbooks used in foreign schools, and hence the need for charts here is not so great. The teacher, in most European schools, is the source of far more of the information pupils get than is the case here; and this partly explains the need for such helps.

In each school of any size in Germany there is generally a room set apart for teaching helps, and these helps are drawn out by the teachers when needed. This material (*Lehrmittel*) covers a wide range of instruction; wall pictures and charts representing history, geography, architecture and art in its various forms, anatomy, physiology, botany, zoölogy, history of religion, manufacturing, commerce, invention, and all phases of active German life are furnished in great abundance. Besides these, the local museums often contain rooms or sections set apart for pedagogical purposes. These often contain models of farming tools, school benches, tools for working wood and iron, mineral cabinets, in addition to an abundant supply of maps, charts, and prints on all phases of instruction. (See MUSEUM, EDUCATIONAL.)

When we compare the secondary schools in this regard, our best high schools are as thoroughly equipped with apparatus as those of like type found abroad. In fact, we are spending more for scientific apparatus and equipment for high school laboratories than is generally spent in Europe. On the other hand, we are not so careful in our selection of apparatus.

The general principles which seem to be emerging to guide us in matters of school apparatus may be summed up and stated as follows:

1. The more thoroughly teachers are educated and trained for their work, the less the need for specially prepared and complicated apparatus.
2. The better the curriculum is adjusted to the needs and capabilities of children, the fewer the requirements for experiments or methods demanding apparatus beyond the power of the teacher to supply.
3. The simpler the apparatus and the more natural the experiment or method, the more satisfactory are the results for children of the elementary and high school grades.
4. Apparatus made by the pupils and teachers working together, or by the pupils themselves, often serve to impress the essential purpose of an experiment to better advantage than more perfect laboratory appliances furnished ready made.
5. It is better for the pupils themselves to perform a simple significant experiment illustrative of some important truth than it is for the teacher to perform in their presence a more elaborate experiment directed toward the same end.
6. School appliances designed to illustrate those forces and phenomena of nature which have proved themselves significant are more important than those which give spectacular results not readily seen outside the schoolroom, and less obviously related to the immediate needs of life.
7. Good teachers are increasingly utilizing machine shops, electric lighting plants, water systems, scientific agriculture, and manufacturing industries of all sorts, to supplement school experiments and to render them more significant.

There is a growing use of photographs, picture post cards, illustrated magazines, stereopticon slides, and projectiscopes, to bring distant scenes within reach of school children. The only danger here is, that such material may absorb an undue share of time, and the real world around them may never be made significant.

F. B. D.

See BLACKBOARDS; LABORATORY; CHEMISTRY, METHODS OF TEACHING; PHYSICS, METHODS OF TEACHING, ETC.; TRAINING OF TEACHERS; VISUAL AIDS.

APPARATUS FOR EXERCISES. — See ATHLETIC FIELDS; GYMNASIUM EQUIPMENT.

APPARATUS, PSYCHOLOGICAL. — See LABORATORY, PSYCHOLOGICAL.

APPERCEPTION. — Literally, *added to perception.* In the current usage of to-day two somewhat distinct meanings are apparent. The psychologist means by apperception the interpretation of sensations. Thus to him apperception is necessary in order to get perception, since the latter is a form of consciousness in which sensations and their meanings are fused. To recognize an object, or to give it position and shape, or to ascribe to it reality, is to apperceive it. On the other hand, in educational discussions apperception usually means not the making of a perception, but rather the adding to the bare perception the richer significations that are brought by a broader experience. Thus the educational use of the term conforms a little more closely to its etymology than does the psychological one.

The philosopher Leibnitz introduced the use of the expression. By him mere perception was regarded as a purely immediate form of sentiency. When we become conscious of our perceptions, they are apperceived. Apperception thus relates the perceptions to the self, organizes them as its property, and as the representations by which it endeavors to describe to itself the external world. Before the advent of apperception, therefore, there is no self-consciousness, but only a confused mass of isolated mental elements. Apperception transforms these into genuine consciousness.

The next philosopher of importance to make special use of the term "apperception" was Kant. To him also it meant the unification of perception. By apperception one's perceptions are all united in being referred to a self which is aware of them in various moments of time. Again they are unified as referring to external objects, all of which belong to one world. Perception merely singles out the object in space and time. Apperception relates the perception to the self and to the world. Thus Kant emphasizes the organizing factor in apperception, while Leibnitz lays special stress on the factor of self-consciousness therein. The two uses of the term do not differ fundamentally. According to both, apperception is the spontaneous activity of the self, in reflecting upon and becoming conscious of its perceptions, and this process inevitably organizes them in relation to each other in a self, and also constitutes their external objects into the world of things.

There is, however, one difference between the views of Leibnitz and of Kant that leads directly over to the Herbartian conception of apperception. According to Kant, apperception unifies by applying its own principles of organization to the material given by sense. The product consists therefore of two factors, the organizing warp of *a priori* forms and the organized woof of *a posteriori* content. Both elements are equally distinguishable in the texture of experience. Thus apperception, and, indeed, perception, are to Kant the establishment of relations among the data given by experience, but these relations are not abstracted from experience by the analytic activities of a reflective mind. Rather they are added to experience by the synthetic activity of a constructive mind. Experiencing is the clash between the organizing form and the data of sense, and both factors are clearly discernible in the finished product. To Leibnitz, however, as to all whose psychology follows the lines of the faculty theory, mental activity consists in a manipulation of the data of sense by which these are set in certain relations, and made to reveal certain principles. Thus both form and content are analyzed out of experience by the differentiating power of intelligence.

The Herbartian like the Kantian theory of apperception is based on the conception that mental activity consists in the clash of two factors; that both unite to form the experience. But with Herbart these two factors are not a content given to the mind on the one hand and a form given by the mind on the other. On the contrary, he conceives them to be on the one hand a new datum for experience and on the other the mass of organized experience through which this new datum obtains meaning and interest. To be sure the apperceiving ideas according to Herbart differ from that which is apperceived in being organized, related, assimilated, and therein lies their power to apperceive the new idea. But they are not, as with Kant, mere principles of organization, forms to be applied to new given content. They are simply old experiences that have already been apperceived, and have thus acquired the power of apperceiving the new ones. Thus, experiencing to Herbart is the clash of two factors of content, a synthetic process as with Kant, but not a synthesis of factors radically different in quality. The idea that apperceives differs from the one that is apperceived only in having previously enjoyed the advantage of having been taken in, assimilated, or apperceived by the mind.

The differences between these views of apperception may be figuratively represented as follows. The apperception of Leibnitz is like the activity of a machine that manufactures by combining certain raw materials into finished products. The apperception of Kant is like the activity of a machine that manufactures by adding certain constituent elements to the raw material, as the warp that binds it together. The apperception of Herbart is like the assimilation of food by the body. As new material is assimilated, it becomes part of the living tissue, by contact with which new food can be made to live. According to Leibnitz, the mind thinks or apperceives its perceptions. According to Kant, this process means the imposition of forms of organization upon the perceptions. Hence one is not far wrong in saying that with Kant the *a priori* forms do the apperceiving or thinking. According to Herbart it is one perception, one idea, that makes or apperceives another. Ideas are not dead products of an active mind. They are living forces. They are in a very real sense the mind.

The Herbartian conception of apperception has two fundamentally important applications to educational theory. ① In the first place, it involves the rejection of the faculty theory, and consequently the theory of formal discipline (*q.v.*) as ordinarily held. ② In the second place, it leads to a formulation of method and curriculum from the point of view of the experience already attained by the child. The question of formal discipline is considered in a separate article. Here, however, it may be in place to note that, since according to the faculty theory the ability to carry on the mental process is a function of certain abstract inner powers, there is no reason to suppose that to one who accepts this theory the acquisition of knowledge need be of any educational consequence except in so far as it affords a means of disciplining these faculties. We do not think because we have ideas, but because we have faculties. We do not improve our powers of thought by increasing our stock of ideas, but by strengthening our power to manipulate them. According to the psychology implicit in the theory of Locke and Leibnitz, and even that of Kant, since it is the faculty that apperceives, the teacher should strive to improve this power by training. On the other hand, according to the psychology of Herbart, since it is the idea that apperceives, the teacher should strive to increase the stock of assimilated experience in the child's mind by instruction.

The Herbartian theory of apperception throws the emphasis not on the quality of the mind, but rather on its content; not on the self-activity by which according to many the child's development is wholly conditioned, but rather upon the activity of the ideas, the efficiency of which depends upon the thoroughness with which they have been assimilated. Now effective assimilation with Herbart is, to say the least, very largely dependent upon the arrangement of material in instruction. In other words, the excellence of the child's abilities is mainly the consequence of the efficiency with which he has been taught. However, it is perfectly evident that good teaching produces very different results on different minds. This fact is not neglected by Herbart. He grants the importance of the individuality of the child. But to him this individuality seems not so much the source of those energies by which mental development is to be brought about, as rather a mass of factors likely to interfere with the proper apperception of the material of instruction. Thus the positive factor in mental growth is afforded by instruction. The inner characteristics of the child are regarded rather as negative influences, interfering with or distorting the natural effects that might be supposed to spring from the teaching that has been given. Certain peculiarities, temperament, emotions, disease, are all physiological hindrances to the pure mental process of apperception. They must be known, not to be utilized, but to be counteracted.

Thus according to Herbart the fundamental consideration in education is the order in which material is presented to the child's mind. From the point of view of method, this leads to the so-called *formal steps* (*q.v.*) in instruction. From the point of view of subject matter, it involves the arrangement of the course of study in such an order that each piece of work constitutes the natural preparation for the next. Apperception with Herbart is analyzed into two processes: concentration, or absorption, and reflection. The first involves the taking in of new material, and the second its organization in reference to the whole body of ideas in the mind of the learner. Concentration means that the new idea possesses enough affinity for the contents of the mind to arouse attention, that is, to drag above the threshold of consciousness apperceiving ideas. Reflection means the gradual reorganization of thought under the influence of the new idea. To be absorbed, matter must be clearly presented. This first step Herbart called clearness. Rein analyzed it into two, preparation and presentation. The teacher must prepare the way for instruction by finding what ideas the child already possesses which may constitute a basis for apperceiving the new topic. He must then so present this topic that it is readily seized by the consciousness thus roused to expect it. The successive topics that are presented must also be interrelated so that each throws light on the other. Method must bring out this connection. Hence a second step of method, or association. Associated material grasped together in a unity of reflection gives system, the third step in method. When the mind, thus possessed of system, reacts upon the new thought, it does so with organized method. The step in instruction that aims to insure this result Herbart calls method. As we have seen, Rein breaks up clearness into preparation and presentation. System and method are by him called condensation and application. Professors Charles and Frank McMurry designate the formal steps as preparation, presentation, comparison, generalization, and application.

The requirements of apperception are fundamental in determining the formal steps. They are equally evident in Herbartian schemes for the arrangement of the course of study. Three interrelated conceptions, deduced either wholly or partially from the principle of apperception, have governed the schemes of arrangement of the followers of Herbart. These are correlation (*q.v.*), concentration (*q.v.*), and the culture epoch theory (*q.v.*). By correlation is meant such arrangement of the different lines of work in the school that the work in each constantly bears upon the work that is being done at the same time in the other subjects. There are many schemes and degrees of correlation, but it is evident that the principle always is largely an application of the idea of apperception. So, too, concentration, which means that one subject of study is selected as the central one in the curriculum and all others are studied as means of comprehending it better, is merely a close application of the principle of presenting the new through its relation to the old.

The scheme of concentration has usually been associated with the culture epoch theory (*q.v.*). According to this theory, the studies should be presented to the child in the order of their appearance in the history of the race. Thus the child will be led through a series of "culture epochs" corresponding to those in the history of civilization. The justification for this order of study lies in that it is supposed to be the order of clearest apperception on the part of the child. Two reasons may be offered for this; and each illustrates a somewhat different view in regard to the process of apperception. ①According to one of these views the order of growth in culture is its natural, its logical, its inevitable order. The child must pass through these stages because the nature of the material of culture is such that each stage is the logical and necessary preparation for the apperception of the next. Here we find the views of Lessing, Herder, and Hegel. Herbart, who himself gave a suggestion toward the culture epoch theory, may be said to have found in history the clew to the logical order of apperception.

②The second consideration that led to the culture epoch theory was that of psychological recapitulation. This view was intimately related to, and indeed founded upon, that of biological recapitulation. According to it, the child manifests successively certain instincts. These instincts appear in the order of their racial evolution. Upon them depend the child's interests and activities, and upon interest and activity depend his ability to apperceive. To teach a child of 6 what appeals to instincts that do not develop until 12 is to fail utterly in results. The child apperceives only what he is interested in, and he is interested only in that which appeals to instincts that have at least begun to ripen.

According to the first, the Herbartian conception of culture epochs, the lack of apperception when culture material belonging to later civilizations is presented to a young child is due to the lack of experience. According to the second conception, it is not thus caused, but is rather the result of immaturity of the instincts to which the ideas and feelings of this later culture appeal. No amount of mere experience with words and facts can make a child of 8 comprehend fully tales of romantic love. Mere physical maturity brings with it a pyschological maturity that after all counts most for power of apperception.

So far as the culture epoch is concerned, it is doubtless true that both lines of argument in support of it are in a measure justifiable. But for the treatment of the conception of apperception the differences between them is of great importance. It serves as an introduction to a modern interpretation of apperception somewhat different from that of Herbart. Just as with Herbart apperception is made to depend upon the activity of previously assimilated ideas, instead of as formerly upon that of abstract faculties, so in this modern theory it is made to depend upon the activities initiated by the instincts rather than upon the mere functioning of experience acquired earlier by the individual. Thus in a sense the more modern tendency has been to revive the notion of an inner activity lying behind the mental content and vivifying it.

There are two methods of conceiving this inner activity. ①According to the one, the conception of Wundt, apperception is "the activity of the will in the realm of ideas." The will is an agency determinative of the direction of attention, and in fulfilling this function it lifts certain ideas into the focus of consciousness or apperceives them. ②According to the other conception, apperception is incidental to the functioning of the instinctive activities. When these activities meet a check, that is, when they fail to gain in an automatic manner the results for which they exist, then dissatisfaction is aroused, attention is drawn to the situation, its characteristics are analyzed, and eventually their significance is so interpreted that a satisfactory learned reaction is substituted for the original instinctive one. Thus apperception is a mental activity roused by the need of readjustment, and operative only on those factors that must be distinguished and interpreted in order to secure this result. Instead of being merely a function of previous experience, it is rather a function of those inner instinctive needs around the satisfaction of which both the physical and the mental activities of the individual center.

The Wundtian theory differs from this instinct-motor theory of apperception only in that, after the fashion of Leibnitz and Kant, it emphasizes rather more the spontaneous activity of a purely mental factor. The mind in apperception, according to Wundt, asserts itself, fixing the attention, clarifying the ideas, and thus rousing certain corresponding physiological activities. We feel our mental energy innervating the muscles. Apperception is conation. It is the struggle of the will to determine the conduct of the individual. Thus it is immediately connected with movement, and in fact the sense of the physical activities that apperception initiates intensifies the absorption of the mind in the work of apperceiving.

Right here the instinct-motor or genetic theory makes its point that apperception appears only when there is forced upon the mind a sense of its activities through some failure of adjustment. Thus apperception is not merely a condition of willed movements as with Wundt, but also a result of a failure to move in a satisfactory manner. This failure rouses the mind to discover what it wishes to do, in what respect it has failed to accomplish its instinctive purposes, and the various factors in the situation that may suggest this or that reaction as likely to prove a successful method of dealing with it. The two theories are not antagonistic to each other. Rather they may be said to supplement each other. To Wundt apperception is the intellectual phase of conation. To the genetic theory it is the intellectual phase of readjustment. Wundt finds in it the manifestation of the free inner energy of the self. The genetic theory finds it to be the attention of the mind to its inner needs when these fail to be satisfied by hereditary reactions. When we pass to the educational application of these conceptions of apperception, we find that they lie essentially in the view that interest and effective application to any school work is not directly a function of experience in similar lines, but is immediately dependent upon a sense of the value of this work in satisfying the inner needs of the self. It is true, experience may lead one to see a value in work that to the inexperienced would seem mere useless drudgery. But the experience merely makes clear the connection between the work and the need. It cannot create the need. The energy in a motive comes from within, from instinct or free personality. Experience merely enables this energy to acquire clearness and direction, and thus to become a conscious motive.

Thus the modern schoolmaster, following the genetic theory of apperception, does not expect to get children interested in the matter of instruction merely by connecting it with something already known by the child. It is necessary rather to show that the schoolroom tasks are worth while. There are many things concerning which we know much and at the same time wish to know no more. Often enough the child betrays this attitude in the school. Instruction breeds the indifference of mere familiarity unless it connects itself with needs that to the child seem vital. Objects do not excite attention because they are well known. Indeed, the familiar thing, unless it suggests to us some new problem that we feel to be important, does not seize the attention at all. The important first step in instruction is not mere preparation that simply calls up what the child knows of a subject, but rather the foreshadowing of the application which is to be the final step, and in which all that is to be learned will find its meaning and value. E. N. H.

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APPLETON, JESSE (1772–1819). — Author and educator, attended Dartmouth College; teacher in New England academies; president of Bowdoin College (1807–1819); one of the founders of the Maine Education Society; author of two volumes of essays on educational, social, and religious subjects. W. S. M.

APPLICATION. — In teaching, that general principle which calls for the acquisition or fixing of knowledge through action, expression, or practice: also given as the fifth step in the method of the recitation laid down by the Herbartians. (See Herbart; Method, General; Formal Steps.) The popular pedagogical statement that there should be "no impression without expression" in teaching coincides with this principle. The principle of application has had its fullest exposition at the hands of the followers of Herbart in their treatment of the Herbartian "development lesson," where it is the fifth or final "step" of the recitation. In Herbart's original and expanded outline it was known as the stage of "method" and was the fourth and final "step." In modern pedagogical practice, the principle has two modes of expressing itself: (1) In requiring that the original acquisition of knowledge and values be the product of action, as in any process of "learning by doing." This is the characteristic mode that the principle takes in the "active learning" of the kindergarten and the more modern type of primary school. It is also noted especially in the teaching of manual training, laboratory, science, drawing, singing, and similar subjects affording a large opportunity for action. (2) In requiring that knowledge largely communicated through conversation, or the printed page, be given actual application as a final safeguard against defective mastery. The principle takes this second characteristic mode in the teaching of the more abstract subjects (physics, ethics, etc.) to mature students. In this way general laws, truths, and precepts are brought into effect, tested, and, if necessary, reconstructed.

The principle of "application" has been given an emphasized and extended importance since the advent of modern psychological influence in teaching theory and the introduction of "active" subjects (manual training, nature study) into the curriculum. The advantages which accrue from its use in the teaching or learning process are numerous. A few may be noted: (1) It guarantees a right selection and elimination of facts; (2) These are learned in association, rather than in isolation or in detached groups; (3) The ideas involved in a given subject are properly emphasized in the thought system; (4) They are associated in the order of practical need; (5) The thinking process is improved by the increased interest and attention which comes through doing; (6) The expressed result is a more or less immediate and effective check on error in memory and reasoning; and (7) The stimulus which comes from successful achievement is one of the best incentives to further effort.

The school has many situations and materials through which to exercise, express, or apply what it teaches. The school of the past depended almost completely on verbal expression, just as the modern movement tends to regard the constructive or manual arts as the major means of applying its ideas in the concrete. Beside these, there are the fine arts of drawing, painting, and music, and the subtle expressiveness of face and posture which reveal the ideas and motives of children in the social relations of playground and classroom.

To neglect any one of the characteristic types of expression, or any species of them, may be to lose effective means for giving a better knowledge to children than that they have, or to leave them with undiscovered intellectual defects. Rote repetitions of words meant to express moral laws will not compensate for that loss of spontaneous self-expression which accompanies a repressive school atmosphere. In carrying out the principles of "application" with the materials at hand in school life, four suggestions might be made: (1) No form of application or expression should be neglected. Opportunity for play and sociability on the school ground has a fitness for expressing the real moral knowledge of children vastly superior to any facts about morality which they may express verbally in the classroom. (2) No form of action or application should be used when another is more efficient for the purpose involved. With the average child, talking about an irregularly shaped tract of land is much inferior to making a diagram of it. (3) When either of two forms will do almost equally well, the teacher may well use the most convenient and economical method, even though it be more artificial. In the case of advanced students, it is certainly less wasteful of time and energy to present a mathematical problem through symbols than through objects, the latter method being conceivably better with younger pupils. (4) It will frequently be advisable to use several forms of application as supplementary to each other. Frequently any one method would be inadequate. An account of a school excursion for botanical study may well include oral descriptions, rough drawings, and the display of objects collected. H. S.

See APPERCEPTION; METHOD; TEACHING, PRINCIPLES OF; RECITATION, METHOD OF.

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APPOINTMENT BOARDS. — See BOARDS OF EDUCATION; TEACHERS, APPOINTMENT OF; TEACHERS, AGENCIES; UNIVERSITY BOARDS OF APPOINTMENT.

APPOINTMENT OF TEACHERS. — See TEACHERS, APPOINTMENT OF.

APPORTIONMENT OF SCHOOL FUNDS. — After taxes have been levied for the support of a system of schools, the proceeds of such taxation must be distributed, except in the case of district or town taxation, which is expended where collected, in such a manner as to secure the object for which the taxes were raised. Theoretically the object to be kept in mind in such a distribution is a greater equalization of both the burdens and the advantages of education. (See article on TAXATION FOR EDUCATION.) The different plans in use in the different states vary much in nature and in the success with which they accomplish this purpose. The different bases for distribution may be arranged in an ascending scale, according to their success in attaining this object.

I. **Single Bases of Apportionment.** — By a single basis is meant a plan by which all the school money distributed by the state, or by a county, or both, is distributed to the smaller subdivisions on one single basis, such as enrollment or attendance. This differs from a combination basis, upon which a part of the money is distributed on one basis and the remainder on one or more different bases, the resulting apportionment being a combined result of the use of two or more bases. Under the single basis plan we have the following types, arranged in their order of merit.

1. *Taxes-where-paid Basis.* — This is the lowest and the poorest basis of apportionment in use. By it the state, or the county, merely becomes a tax-collector and gives back to each school unit the money which it has just forced the school unit to pay to it in the form of a tax. The Minnesota "local mill tax" is an example of this, where the county levies a one-mill tax on all property and then gives it to each school district in proportion to the amount paid by each. In the early days of school taxation this basis was commonly used, but it is little used at present, produces no equalizing effect, and its use as an apportionment basis probably will be entirely discontinued before many years.

2. *Taxable Property Basis.* — By this the income from taxation is distributed to the counties or districts on the basis of the taxable property of the county or districts, as shown by the last assessment list, and without reference to

whether the taxes for the year have been paid or not. In this last respect it is more just than the preceding basis, because it provides funds for the maintenance of schools for the education of the children whether their fathers have been able to pay their taxes or not. The basis is used by Pennsylvania for the distribution of one third, and by New Jersey for the distribution of 90 per cent of the state appropriation. Like the preceding basis, it was once much used, but has now been abandoned by nearly all states. It possesses no educational significance, and produces little equalizing effect.

3. *Total Population Basis.* — This basis marked a first step toward a distribution bearing some relation to the number of children to be educated, and was once used much more than it is to-day. New York still uses it as a partial basis for the distribution of state funds, as also does Vermont. Its defects lie in that a census is taken only infrequently, while changes in population are frequent and rapid; that the total population bears no real relation to the number of children in the community, even in rural districts; and that it bears no relation to the number of schools that must be maintained.

4. *School Population Basis.* — This is commonly known as the school census basis, the money being distributed in direct proportion to the number of children of school age (see School Census) in the county or district. It appears at first glance to be a just basis, and its extensive use, 38 states using it in whole or in part as a basis for the distribution of school funds, would indicate that it has been so regarded by legislators and schoolmen. Any careful calculation as to its results, however, will show that it is a very unsatisfactory basis to use. It bears no relation to the real cost of maintaining schools, viz., the number of teachers who must be employed to teach the children. It greatly favors the city as opposed to the country, and the large school as opposed to the small school. It places no premium on the many educational efforts which communities should be encouraged to make for themselves, such as the provision of good teachers, small classes, enforcement of attendance laws, provision of extra educational efforts so as to attract a larger proportion of the children into the public schools, and the awakening of a community pride in the schools themselves. To stimulate a community to educational activity is more important than to reduce its taxes.

5. *Enrollment Basis.* — This is a distinct advance over the census basis, in that a community is paid only for the number of children it gets into the schools for a definite period of time, instead of for the number of names of children it gets on the census lists. It is used as a basis of apportionment in New Hampshire and in Minnesota, where a 10-day and a 40-day enrollment, respectively, are required. It places a premium on getting the child into the school, and in Minnesota on keeping him long enough to get him interested in the school work. This basis, however, must be regarded as a transition basis from census to daily attendance.

6. *Average Daily Attendance Basis.* — This basis is used in whole or in part by a number of states, and is a distinct improvement over any preceding basis. Instead of paying for children on a census roll, or children enrolled for a limited time, payments are made only on the basis of the average number of children retained on the rolls of the school during the entire school year. It is a form of "payment by results," as good daily attendance is the result of many community efforts which should be encouraged. It stimulates communities to educational activity, and involves all that the enrollment basis involves, and more.

7. *Aggregate Days' Attendance Basis.* — This basis is an attempt to measure even more closely the work of the schools, and to pay only for the actual attendance. Average attendance is calculated on average membership (see separate articles for definitions of terms), and hence includes children belonging to the school and absent for a day or two at a time as well as those actually present. Aggregate days' attendance, on the contrary, includes only those actually present, counting by half days, and the total amount to be apportioned is divided by the total number of days' attendance, thus giving a certain number of cents per child per day to be paid. This basis is the most accurate of all, but its use alone would exact a heavier penalty from the small country school in favor of the large city school, due to the longer term and the larger number of children taught by one teacher in the cities, than does the school census basis now in use. Combined with some basis which first recognized the unit of cost of maintenance, which is the teacher or room maintained, it is the most just of all bases. It is so used by New Jersey in making the county apportionment.

8. *District Basis.* — This basis is used in part as a basis of apportionment by a few Western states. It is an indirect attempt to recognize the unit of cost of maintaining a school and the teacher who must be employed. In making apportionment a definite sum or proportion is first set aside and given to each district, without regard to size. It is also an attempt to equalize the apportionments as between rural and town or city schools, the district quota being the same for each. Combined with some other basis it can be arranged so as to produce good results, but used alone it would be impractical and unjust, except in a state where all the districts employed about the same number of teachers, in which case it would approximate the next basis of apportionment.

9. *The Teacher Employed Basis.* — This is used as a partial basis for the apportionment of funds by New York, New Jersey, Pennsylvania,

and Vermont. Delaware alone uses it as a single basis. It can be shown by calculation that it is in many respects the most just single basis that could be used. The money collected from all on the basis of wealth would be distributed for the benefit of all on the basis of the number of teachers needed to teach the children for whom the taxes were collected. The larger communities, where larger salaries are paid and more children are taught under one teacher, would have more parents and more wealth to provide any extra sum needed. The basis, however, fails to place any premium on many desirable educational efforts on the part of a community, and in this lies its chief defect. Combined with aggregate days' attendance it forms one of the most just and one of the best combined bases of apportionment that can be devised.

II. **Combined Bases of Apportionment.** — A combination of two or more bases is used by a number of states in order to secure a more equitable result in the distribution of school money. Pennsylvania, for example, distributes the state appropriation on the bases of teachers employed, school census, and property valuation, one third on each; New Jersey in making the county apportionment gives $200 for each teacher employed, and the remainder is apportioned on the basis of aggregate days' attendance; in Nebraska one fourth of the county apportionment is given to the school districts equally and without regard to size, and the remainder on the basis of school census; and California, in making the county apportionment, gives $550 to each school for each teacher, counting 70 census children as a teacher, and the remainder on the basis of average daily attendance. Various combination bases can be devised, which, if carefully calculated out, will give fairly equitable returns, but the best basis, from an educational point of view, is a combination of teachers actually employed with average or aggregate days' attendance, together with a small reserve fund, as will be described later. If the length of term varies greatly throughout the state, then average daily attendance is the better, as it equalizes all schools as to terms and does not work injustice to the rural schools; but if the term is about the same throughout the state, as in Connecticut, where all schools are required to provide a nine months' school, then aggregate days' attendance is the better, as it places a premium on more desirable efforts on the part of the community.

III. **Effort and Need Bases.** — In a few states an attempt has been made to apportion at least a part of the fund or taxes with more direct reference to the efforts made by communities to provide good schools for themselves, and also with reference to the relative needs of communities. The setting apart of a reserve fund of from 5 per cent to 10 per cent, to be used, after the regular apportionment has been made, to render additional assistance to those communities which have made a maximum effort and are still in need of additional assistance to enable them to maintain a school the length of time required by law, is the simplest form of such aid. The regular apportionment basis continues to be used, and the reserve fund is used only to render additional assistance to those communities whose peculiar circumstances warrant extra aid. The State Board of Education usually distributes the reserve fund, and only after investigation. Indiana's 5.2 per cent reserve fund is an example of this form of extra aid. Vermont and New Hampshire give somewhat similar assistance to those towns whose tax for schools has exceeded a certain rate. Massachusetts uses the entire income from its school fund to help poor towns, distributing the fund only to those towns having a total valuation of taxable property of less than $2,500,000, and having a graded schedule based on valuation and the proportion of the total town tax devoted to schools, those having the lowest valuation and devoting the largest proportion of their taxes to schools receiving the largest amounts. The principle involved in the setting aside of a reserve fund for the aid of necessitous communities is one that ought to secure for it a wide adoption and usefulness. After the best uniform apportionment plan that can be devised has been put into use, there will still be a few poor communities which cannot meet the demands of the state, though they raise the highest amount of tax allowed by law.

In Connecticut a still further extension of the principle of the equalization of opportunities and advantages has been made by a law which virtually equalizes the advantages of education to every child in the state up to $25.00 per year, on a basis of average daily attendance, and at the same time equalizes the burden of support on every taxpayer down to a tax of four mills on the dollar.

High School Apportionments. — In most states no distinction is made in the apportionment of funds between elementary schools and high schools, the money going to a common school fund and any balance needed being raised by extra local taxation. In a few other states, California being an example, all funds for the two classes of schools are carefully segregated, and extra aid for high schools is apportioned at a different time and in a different manner from that for elementary schools. In a number of other states where this segregation of funds is not made, some form of extra aid is granted for the maintenance of high schools. For a consideration of this, see HIGH SCHOOLS, SUPPORT OF. E. P. C.

Europe. — The apportionment of school support in European countries is far more complicated than in the United States, and frequently involves traditions and vested interests that are hard to disentangle. In general, however, it may be said that Great Britain distributes its large national grant to public education partly to relieve local burdens and partly to stimulate local effort; and that in the centralized administrative schemes of France and the German states the state grants are contributions to aid the communities in carrying out prescribed governmental measures. In England, for example, local authorities fix salaries; on the Continent the state or nation does so (at least the minimum). England may withhold a grant to a community paying salaries deemed too low; in France the state simply pays the prescribed salaries; and in Prussia the state aids the community in paying such salaries.

Apportionment in England.— Governmental recognition of education came in England through natural grants to subsidize private or philanthropic effort. Somtimes grants were simply lump sums; sometimes based on numbers of children dealt with. By the middle of the nineteenth century an elaborate scheme of payment by results had developed. National money was distributed to privately managed schools, not on the basis of mere numbers, but on the basis of the numbers who could reach grades of scholarship tested by examinations. The scheme was logical, but the system of examination proved impossible in the case of young children. The scheme was abandoned for elementary education (though long continued for technical and art education), and there developed a complicated system of grants: (1) An average attendance grant of 22 shillings for older children, 17 shillings for infants; (2) A fee grant for those schools (now all elementary schools) that did not collect fees from parents (by Act of 1891, amounts to 10 shillings); (3) A special subject grant, for manual training, cookery, and agriculture, where equipment and teachers are excessively expensive; (4) An aid grant of 4 shillings per child in attendance plus 1½ d. for every 2 d. that a rate (tax) of 1 penny yields less than 10 shillings per scholar; (5) A small population grant, which in effect grants £10 or £15 to small rural schools; and (6) A temporary special aid grant for highly rated communities (applies in effect to rapidly growing communities where local improvements are a heavy burden).

The above complicated scheme does (*a*) give an outright contribution to public education, (*b*) aid weaker communities, and (*c*) stimulate local effort. By a system of inspection the government seeks to preserve standards, and may withhold all or part of its grant as a penalty for inefficiency. Various standards are prescribed as (*a*) quality of buildings, (*b*) number of pupils per teacher, (*c*) salary schedule of teachers, (*d*) number of trained teachers, (*e*) equipment, etc.; the net effect of which is that the national Board of Education can practically impose any standard it sees fit.

In 1906–1907 the national government contributed to the support of elementary education in England over $50,000,000 (£10,408,000) whilst local contributions were about $44,000,000 (£8,930,000). The state thus contributed nearly 55 per cent.

Since 1855 the national government had also subsidized technical and art education by a variety of grants calculated to encourage local enterprise and supplement local effort in case of necessity. These were the South Kensington grants, and their bestowal carried the right of inspection. The basis of apportionment was very complicated, resting partly on the principle of payment for results and partly on need of assisting in local equipment. These grants have now been transferred to the Board of Education, for administration, who thus control the expenditure of about $2,800,000 (£456,000) in 1907–1908. The Board of Education also makes special grants to encourage the local training of those destined to be teachers; and under the Act of 1902, it was empowered to subsidize secondary education where approved standards were maintained.

Germany. The revenue for the support of elementary education in Germany is derived from two main sources — state and local. In 1900–1901 the education of each pupil cost 47 marks, of which on the average the state contributed 13.6 marks, or 31 per cent. In Prussia the contribution of the state had risen from 5 per cent in 1871 to 27 per cent in 1901, while during the same period the contributions of school fees had fallen from 19 per cent to a negligible quantity, a fraction of 1 per cent for nonresidents.

The principles of apportionment may be illustrated from Prussia. There the first principle in relation to elementary education is that the local community (*Gemeinde*) must erect buildings and pay the teachers. This burden rests on heads of families or householders (*Hausväter*) with or without children, but it may be distributed according to confession — each church member contributing to his own school. This household tax is distributed according to possessions. There is added a tax on the ground landlord.

The second principle is that state aid shall be given to enhance the pensions and insurance of teachers. For the first teacher of the community, 500 marks, for the other male teacher, 300 marks, and for the female teachers, 150 marks, is the state contribution. This contribution may not be given for more than 25 teachers in any one district, however. Also it adds to the pension fund up to 600 marks, and proportionately to widows' and orphans' pensions. (Lexis, *Das Unterrichtswesen*, III, 96.)

The third principle has reference to needy communities, or those that have already heavily taxed themselves. Here state contributions may be made to extraordinary expenses in regard to buildings, etc., and always on the condition of a full exercise of local effort.

It will be recalled that the State fixes (minimum) salaries, qualifications, and pensions of teachers. Hence it is under no obligation to induce local effort in these directions through its state funds. But it does aid in improving the status of the teacher and in helping the community to better equip its schools.

In regard to secondary and higher education the same principles do not apply. Many of the secondary schools are traditionally royal or state institutions, and as such derive their revenue from endowments, fees, and direct government appropriations. Others are supported by municipalities with the aid of some state contributions. To this class belong especially the scientific secondary schools (*Realschulen*). Higher education is entirely supported by the state, beyond the amount raised by fees and endowments.

France. — There is in France little significance in the matter of apportionment of funds as that term is understood in the United States. The state (or nation) through central authority establishes schools (except infant schools), fixes salaries of teachers, provides for salary augmentations and pensions, and itself pays these salaries. In 1906 the nation's contribution to current expenses of elementary education was 65.5 per cent of the total. The communes must provide buildings and equipment, but the government now administers a considerable loan fund to aid or stimulate this work. Efficiency is secured by state inspection. The inspectorate and the central authorities decide all questions. D. S.

See Cost of Education, and the articles on the various national systems.

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For a detailed consideration of the various American plans for the apportionment of school funds see Cubberley, E. P., *School Funds and their Apportionment.* (Teachers' College, Columbia University, Contributions to Education, No. 2, 1905.) For statistics, see the *Annual Report of the U. S. Commissioner of Education* (Washington, D.C.). For England, see *Statistics of Public Education in England and Wales,* — *Annual Reports of the Board of Education.* For Germany, see *Statistisches Jahrbuch für den Preussischen Staat;* Lexis, *Das Unterrichtswesen.*

APPOSITION, METHOD OF. — See Catechism; Colloquies.

APPREHENSION. — A term employed to translate the term *Perception* as used by Leibnitz and Wundt. This term is in antithesis to the term *Apperception* as employed by these writers. If the term *Perception* is translated by the English word "perception" an ambiguity arises which was not present in the mind of these German writers because the German equivalent of the word "perception" is not of this form.

APPRENTICE TEACHER. — A student teacher; one assigned to practice teaching as part of a course of professional training for teaching. Such teaching may be done (1) in a special training or practice school, parallel to the theoretic work, and under the direct supervision of the faculty of the professional school, or (2) in the classrooms of the regular school system, at the close of a period of theoretic training, and more or less under the supervision of the regular school officers. The term "student teacher" is more appropriately applied to a practice teacher working under the first-named conditions, and "apprentice teacher" to one working under the second-named conditions. The conditions of practice teaching do not always fall into one group or the other, a mixed plan being used, when the terms are used interchangeably. "Practice teacher" is a generic term which may be rightly applied to all teachers still within their period of training or probation. H. S.

See Teachers, Training of; Monitors; Pupil Teacher.

APPRENTICESHIP TEACHER. — See Pupil Teacher.

APPRENTICESHIP AND EDUCATION. — **England.** — *History.* — The apprenticeship system arose out of the burghal policy of modern Europe, when all craftsmen in towns entered guilds established for mutual protection. They were founded on the principle that labor employed in mechanical trades required more skill and experience than are requisite in husbandry. It is not known precisely when apprenticeships were first established, but they were first mentioned in the statutes in 1388 (12 Richard II, c. 3) two centuries after the establishment of guilds in England. Henry IV, complaining that husbandry was impoverished by reason of the peasantry leaving the country districts to learn trades in the cities and boroughs, passed a law to repress the inferior classes from becoming apprentices (7 Henry IV, c. 17). (Repealed as regards London by 8 Henry VI, c. 11. Repealed as regards Norfolk by 11 Henry VII, c. 11, and by 12 Henry VII, c. 1 in favor of Norwich.) To exercise a trade it was necessary to be free of the fraternity of that trade, and the only way of obtaining this freedom was by serving an apprenticeship to a member of the fraternity. As the various trades became incorporated they were called universities (i.e. *corporations*), and are often mentioned in the old charters of towns. The term of apprenticeship in these incorporations was 7 years, which is now the period required by a student to obtain the title "master" in the older universities. While these regulations have been relaxed in trades, they have been strictly guarded in the learned professions. The great *Statute of Apprentices* was passed in the reign of Elizabeth (5 Eliz. c. 4). This act prevented any one serving less than a 7 years' apprenticeship from engaging in any trade and was an attempt to cope with the want of skill in the tradesman. The statute has been much condemned by Adam Smith and other writers as interfering with the rights of the individual, while others aver that it (1) led to the elimination of inferior work, (2) maintained a high rate of wages. The statute of Elizabeth remained in force for two and a half centuries, when an improved state of trade and manufactures and the changes consequent on the introduction of machinery and the factory system demanded an alteration in the law. The result of a petition praying that the statute might be rendered more effectual resulted in the passing the Act 54 George III, c. 96 (1814), repealing the statute so far as it enacted that no person should exercise any trade without having served a 7 years' apprenticeship to it. A reservation, however, was made in favor of the bylaws of the City of London and other corporate towns. The latter were deprived of their rights as to apprentices by the *Municipal Corporations Act* of 1835, and London is now the only city which has its own peculiar jurisdiction over apprentices. On the repeal of the statute of Elizabeth wages rose and fell according to the demand for skilled labor.

Influence of Factory System. — The introduction of machinery, followed by the subdivision of many trades, made the 7 years' apprenticeship no longer necessary or desirable. The employee had now only to learn a single process. Further, the concentration of work into factories led to a decrease in the number of apprentices employed, owing to a repugnance of parents to send their children away from home, and it was not until wages of adult artisans had been reduced very considerably that other than adult labor was employed to any extent in mills. The deficiency was made up by the Acts 42 George III and 45 William IV, c. 76, c. 46, which allowed Overseers and Guardians of the Poor to bind out apprentices from the different workhouses. These acts contained no directions to the master to afford the apprentice any instruction, the system being merely a billeting of the poor in order to relieve the parish funds. The harsh treatment meted out to parish apprentices led to the Act of 1802, passed "for the preservation of the health and morals of apprentices and others employed in cotton and other mills."

Features of the Old System. — Three characteristics distinguished the old system of apprenticeship: (1) the indentures which bound master and apprentice together for a term of years, (2) the contract in which the master agreed to initiate the apprentice in the mysteries of his trade, (3) the custom of the apprentice to lodge in the house of his master. The system ensured three principles essential to social well-being: (1) the youth of the country was under control up to the age of 21 years, (2) the control was paternal in character and inspired by a living and individual interest, (3) each youth as he crossed the threshold of manhood, found opening out for him a career for which he had been specially trained. That evils crept into the system cannot be denied, but the system recognized and made provision for the efficient discipline and training of the youth of England.

Decay of Apprenticeship. — Under the conditions of modern industry the significance of apprenticeship could no longer be secured. The increase in the size of workshops made impossible the personal relations between master and apprentice. For the personal relations there was substituted the cash nexus between the capitalist and the wage earner. The division of labor and the tendency to separate boy's work from man's work not only prevented but rendered unnecessary an all-round training in the various departments of a trade. With the disappearance of the paternal relation, neither employer nor employed had any desire to bind himself to the other for a prolonged period. And so, except where conditions were very favorable, in rural districts, in favorable trades and small towns, the apprenticeship system gradually but surely began to decay. (It has been computed that at present not more than 10 per cent of the members of English trade unions have been indentured apprentices to the trades in which they are now engaged. Webb, *Industrial Democracy*, Vol. II, p. 474.) With the repeal of the *Statute of Apprentices* in 1814, and the reform of the Poor Law (1833), the State definitely disclaimed all responsibility for the training and welfare of the young until the efforts of philanthropists like Shaftsbury, Fielder, and Oastler, and also of those pioneers of trades unionism, forced the State to recognize the evils which that age of uncontrolled liberty had called into being. The decay of apprenticeship was affected by the industrial revolution in two ways: (1) by the congregation of communities into towns where the boy was employed in mills and factories, and was put to work at one specialized process and nothing more, (2) by the attempted limitation of apprentices by trades unions where it could be effected. The result was that the youth of the nation rapidly degenerated physically, while educationally they were destitute.

New Forms of Apprentice Education. — To meet the decay of the apprenticeship system and to supply some form of education to replace the training which it afforded, mechanics' institutes (*q.v.*) sprang up to supplement the education of the workingman and boy. Where these did not disappear through inanition and lack of support, they developed into polytechnics (*q.v.*), technical schools, technological institutes and colleges, which were fostered by the grants of the Science and Art Department and later on under the *Technical Instruction Act* of 1889.

(See INDUSTRIAL EDUCATION; TECHNICAL EDUCATION; ENGLAND, EDUCATION IN; TRADE SCHOOLS.) The development of technical education has thrown a new light on the possibilities of apprenticeship training. It is being felt more and more that industrial efficiency can be promoted only by having not only skilled, but intelligent, theoretically trained workmen. Though daily instruction for apprentices is far from being generally adopted in England, signs are not wanting that enlightened employers see that if England is to maintain its prestige as a manufacturing nation, an opportunity for combining shop work with technical education must be afforded to the future mechanic. An increasing number of firms in various trades have already taken advantage of existing facilities, and allow apprentices to attend technical classes during their working hours. This is especially noticeable in engineering and shipbuilding industries, where the various subdivisions of labor and the use of special machinery render it difficult for the apprentices to acquire more than a small amount of manipulative skill and a very slight knowledge of the various processes of the trade in which they are engaged. Various methods are adopted according to the requirement of the firm, the chief being: (1) Apprentices attend technical classes one or two days each week during their apprenticeship. (2) Apprentices attend technical classes during slack periods varying from two to four months. (3) Attendance at a technical class for a specified course entitles a youth to a shorter apprenticeship, one year, and in some cases two years, being allowed.

Five large railway companies have established mechanics' institutes in various centers, notably in Horwich, Crewe, London, Darlington, Gateshead, York, where apprentices attend during the daytime without loss of wages. In a number of works, notably Brunner, Mond, and Co., Northwich, Cheshire; Lever Bros., Port Sunlight; Clayton and Shuttleworth, Lincoln, attendance at technical classes is made a compulsory condition of apprenticeship.

Apprenticeship Committees. — Along the lines here mentioned there is a possibility that there will be a recrudescence of apprenticeship training. For this purpose committees for apprenticing young boys are being established and are having a marked effect upon the education of the skilled mechanic. Originally the system was started by the Jewish Board of Guardians in 1840 to assist poor parents to apprentice their boys to a skilled trade. The committees' functions are: (1) To select an occupation for the child. (2) To grant a loan (premium) where necessary for books, clothing, etc. (3) To indenture apprentices wherever possible. (4) To watch over boy or girl during the apprenticeship. Where employers do not receive indentured apprentices, Apprenticeship Committees have an indenture form of their own which makes the boy and girl realize their responsibility in the matter. In most cases it is a compulsory condition that the boy attends technical classes, and wherever possible employers are chosen who allow a certain time off during working hours for the purpose of attending technical classes without loss of salary. These committees have united in a Central Association for mutual coöperation and support. (Address, Denison House, Vauxhall Bridge Road, London, S.W.). This binding together of forces is all for the public weal, and will enable the committees to look at the question of profitable employment in its widest aspect. Already their experience is being utilized by juvenile labor exchanges and employment registry committees that are being established throughout the country.

Arising out of the attitude of trade unions toward industrial education a recent proposal has been made to apprentice the young workman directly to the unions instead of to the employers. It is hoped in this way that the feared exploitation of trained apprentices by employers will be prevented, and at the same time these would not come into competition with adult workers, particularly at a time when unemployment is pressing for immediate attention.

From still another point of view a revival of apprenticeship is being advocated. Technical schools, it is claimed, are not a substitute for apprenticeship, because they tend to eradicate individuality and reduce all workers to a dead level. What is required now is the raising of standard and ideals of work. The old guilds did not flood the market with cheap goods, but paid considerable attention to the artistic element. On this side the revival of apprenticeship on a small scale could be turned to advantage in restoring the arts and crafts. Such a plan has the further recommendation that it would not interfere with the regular system of manufacture and labor by adult workmen. (See *London Daily News*, Nov. 13, 15, 16, 1909.)

In June, 1910, the Juvenile Labor Bureau was transferred from the Board of Trade to the Education Department. By this latest development, all the work hitherto carried out by Skilled Employment Committees, which were voluntary organizations working under great disadvantages, will be taken over by the Borough and County Councils. This, it is expected, will lead, either (1) to the systematic reorganization of the apprenticeship system; or (2) to the system at present in vogue in Germany, where the apprentices' working hours are limited by the educational authorities, who insist that the apprentice shall receive, in addition, technical instruction in his craft up to the age of 17, and in some cases to 18. Similarly "Scholars' Employment Bureaus" are being organized in the manufacturing centres throughout the country. Their aim is to save boys and girls from "blind alley" employments, to which they are attracted by the relative high wages of the early stages. These committees work in connection with the employees, all of whom are circularized for information, and on the other hand through the school teachers. When the time approaches for a boy to leave school, his parents get a letter from the headmaster asking them to meet him and discuss the lad's future. In very many cases the teacher has a better idea as to where the boy's special abilities lie than have his parents. The class teacher is present at the discussion, and it having been settled what calling is most likely to suit the boy, a card is filled up giving particulars about him, and if the authorities or the school itself know of no situation open that will suit, the card is sent to the Central Education Office, where, of course, a complete register is kept.

Summary. — With increased facilities for education the needs of industrial workers have created a widespreading interest: (1) Among employers of labor, who expect technical training to provide them ultimately with workmen possessing an industrial intelligence at present lacking in the average artisan to-day, owing to the passing away of the old system of apprenticeship. (2) Among the rank and file of workers, who see in it a means of escape from the monotonous routine which specialized industry imposes upon the worker to-day. (3) Among sociologists, who see in its adoption a means of securing industrial efficiency leading to a higher standard of life for the worker. (4) Among educationists, who feel that the present type of school does not meet with the needs of a great mass of the State's children.

Apprenticeship Legislation. — There still survive in the Statute Book several regulations relating to apprentices. Thus by the statute of 1536 (28 Henry VIII) companies cannot restrain their apprentices from establishing shops when they become free. By 18 George III, c. 47 (1777) no child apprenticed can continue as such after the age of 21. In 1814 (54 George III, c. 96) the *Statute of Apprentices* (5 Eliz. c. 4), so far as it enacted that no person should exercise any trade without having served 7 years' apprenticeship to it, was repealed except for customs in respect for London. Other legislation regulates the apprenticing by overseers of parishes. The better protection of apprentices and their supervision by overseers and guardians is provided for by 14 and 15 Victoria, c. 11 (1851). Endowments for the payment of apprentices' fees were made educational endowments by 32 and 33 Victoria, 1869. The *London (City) Apprentices Act* (1889) provides (1) For apprentices of not less than 4 years and not more than 8 years. (2) To omit the covenant binding the apprentice not to marry during the period of apprenticeship. (3) To omit the covenant on the part of the master to provide meat, drink, apparel, lodging, and other necessaries for apprentices, and substitutes payment in wages to be mutually agreed upon.

The following laws at present regulate apprenticeship: —

(1) The apprentice must be bound of his own free will or with the consent of his parent or guardian. (2) The apprentice agrees to faithfully serve the master or his representatives for the term specified in the indentures. *N.B.* Unfaithful service includes waste, injury to master's property, unlawful absence from work, disobedience of lawful orders, malpractices. (3) The father or guardian must guarantee to provide the apprentice with sufficient food, clothing, lodging, and all necessaries (unless as agreement otherwise is arranged with the master). (See 5.) (4) The master agrees to receive and instruct (or cause to be instructed) adequately the apprentice to the best of his knowledge, power, and ability throughout the term of his apprenticeship. (5) The master must provide the apprentice with adequate board, lodging, and medical attendance, and treat him as one of the family (unless an agreement otherwise is arranged) (see 3), or pay a sum of money as wages (weekly or monthly) in lieu thereof. (6) Wages may be deducted by the master (except in case of illness to be specified by a qualified medical practitioner) for willful default, neglect, or absence from service of the apprentice. (7) Reasonable fines may be deducted from wages for breaking rules (which must be set forth) of the master's establishment. (8) The hours of work must be specified, and overtime must be paid for at a rate specified. (9) The master must pay all travelling expenses of journeys incurred by the apprentice in connection with the business of the said master, and is responsible for board and lodging of the apprentice when the latter is working at a distance (specified). (10) The apprentice may be dismissed for (*a*) gross misconduct, (*b*) idleness, (*c*) incapacity of the apprentice to learn his trade. *N.B.* (*c*) at master's discretion, but the apprentice may appeal to justices.

General. — A contract of apprenticeship is one whereby one person becomes bound to teach another a certain profession or trade, and the latter is bound to learn it and to serve as an apprentice. In common law "writing" is necessary if the contract be for more than a year; if for less than a year, no written agreement is necessary.

Education of Apprentices. — Three types of facilities are afforded for the training of apprentices in technical branches. In the first rank are to be found the regular technical schools, which are more and more tending to adapt the whole or part of their courses to the needs of local industries. The employers in many cases compel their apprentices to attend for part time, and in some instances pay their fees. The other practice is to establish schools within the employers' works under the charge of a superintendent who is acquainted with the needs of the establishment. These schools tend to be very specialized. In the third class employers may insist that their apprentices attend evening technical courses. Examples of each type will be given without making any attempt to be exhaustive. At the same time it must be noted that these represent the highest class of employers engaged in industries not only based on technical skill, but in competition with other countries for the markets of the world. At present their experimentation is of importance as a signpost for other employers in smaller industries, and as a guide for future legislation.

1. Railway companies make provision for the attendance of their apprentices at technical schools without loss of salary. Thus apprentices from the Great Eastern Railway Co. attend the G. E. R. Mechanics Institute at Stratford, London, for at least one session of 6 months. Day classes are also held in the railway works. The company pays part of the fees, and no deduction is made from the salary. The Great Western Railway Co. pays the fees of selected apprentices to attend for 1 year in the workshop and for at least one session in the evening technical classes of the Technical School at Swindon. The London and North Western Railway Co. allows apprentices in the electrical department to attend day classes in technological subjects for one half-day weekly at the Mechanics Institute, Crewe, which was built by the company. So the apprentices from the London and South Western Railway Co. may attend morning classes at the Battersea Polytechnic, London; from the Midland Railway Co. at the Technical School, Derby.

2. The railway companies are followed closely by the engineering and shipbuilding trades. Apprentices from Vickers, Son and Maxim, Ltd., who have had a high school or grammar school education must attend a two years' course in the Technical Department of Sheffield University, either as a preliminary to entering the works or at a later period of their apprenticeship at their own option. In such cases the apprentice will reënter at the rate of pay which he would have been receiving, if these two years had been spent in the workshop. Selected apprentices from Mather and Platt, Salford Ironworks, attend technical courses at the Manchester School of Technology one afternoon each week without loss of salary and pay their own fees. The firm makes attendance at evening classes a condition of engagement as apprentices. Hans Renold, Ltd., Manchester, pay the fees of apprentices who attend the same institution for one whole day each week for technical subjects. Other manufacturers in the neighborhood of Manchester follow the same plan. As a result of a conference at Sunderland between the authorities of the Technical College and local engineering and shipbuilding firms, apprentices during the first two years in the workshop must attend technical classes in engineering subjects. Some 25 studentships are awarded on the results of examinations on the work of the evening classes which enable apprentices to attend day classes for six months in each year for three or four years. The Belfast Technical School provides courses preparatory to apprenticeship and also for apprentices engaged in the local shipyards, who are allowed to attend one full day each week without loss of salary, and whose fees are paid by the employers. The Bellis and Morcom Engineering Works exempt apprentices who attend evening classes at the Birmingham Technical Schools from attendance at work on the following day between 6 A.M. and 9 A.M., and also advance wages on reports of progress from the school principal. Wm. Denny and Son, Dumbarton, permit those apprentices who gain scholarships at the West of Scotland Technical College to attend courses for 6 winter months and shopwork during the rest of the year. The time spent at college is counted as part of the apprenticeship period. Arrangements are also made by employers at Middlesboro' and Derby for the attendance of their apprentices at the local Technical Schools.

3. In the chemical industry, Brunner, Mond and Co. compel their apprentices to attend evening classes at the Verdin Technical School, Cheshire, and selected apprentices may attend day classes on two afternoons each week. The Coalport China Co. permits apprentices without loss of salary to attend the Coalportdale Art School, Salop, at arranged periods during the day. Selected dressmaking apprentices from Debenham and Freebody are allowed to attend courses in dressmaking at the London Polytechnic on two afternoons each week. The Masters' Association of Painters and Decorators pay the fees of apprentices to attend art courses at the Bradford (Yorkshire) Technical College from two to five days per week during the first year of their apprenticeship. Arrangements are made for house painters' apprentices at Halifax and Manchester.

4. Clayton and Shuttleworth, Ltd., Lincoln, manufacturers of agricultural machinery, have established a practice which it is hoped will combine the old system of apprenticeship with the modern factory system. A private school is maintained inside the works in which courses of instruction pertaining to the various trade processes carried on in the works are given under the guidance of an expert superintendent who has risen from the ranks. As far as possible every apprentice receives in addition a practical knowledge of as many processes allied to his trade as possible. All apprentices spend a certain amount of each week at class instruction, books and material being supplied free. Merit is recognized, and all apprentices of exceptional ability are given opportunities to enable them to get an all-round knowledge of the trade which will enable them to take positions of foremen or managers of works. Apprentices are taken on at any age from 15 to 22 years, but all receive the same wages at the start. The trades taught are machinist, fitting

and erecting, toolmaking, wheelwright, molding, smithwork, boiler making, pattern making, joinery. The outcome of this scheme is being watched with interest by educationists throughout the country.

5. Apart from these institutions in which the employers themselves take an active interest, numerous technical and evening schools provide courses which are attended voluntarily by apprentices at their own expense outside of working hours. Without any attempt at elaboration three objections may be stated to this system, (*a*) such courses are attended only by the most ambitious pupils, (*b*) by those whose parents can afford to keep them at school, and (*c*) evening study at the end of a long day's labor is likely to be unprofitable in many cases. This aspect of apprenticeship training, however, resolves itself into the whole question of industrial and technical education, which will be found treated under those captions.

So far as any tendency can be observed at present, England is moving in the direction of throwing the onus of the training of apprentices and young employees on the employer, who in the near future will be expected, if not compelled, to allow those whom he employs to attend courses to continue their education. (See *Report of the consultative committee on attendance at continuation schools.*)

France. — The institution of apprenticeship in France appeared as a feature in the life of the craft guilds or trade corporations that developed from the eleventh to the thirteenth centuries parallel with the growth of the communes. The first record of the regulations governing apprentices appears in *Le Livre des Métiers*, by Étienne Boileau, appointed provost of Paris by St. Louis in 1261. The conditions attaching to apprentices in all trades then existing are here set down.

The contract of apprenticeship was a very formal affair, made before witnesses, among whom were officers of the corporation. The contract was often in writing and placed among the archives of the guild. It was very explicit in regard to the duties of the apprentices, and less so in regard to the responsibilities of the master. Before the engagement of the apprentices the officers of the corporation were supposed to assure themselves as to the morality and capacity of the patron. In a very few trades, such as the barrel makers, masters were permitted to take as many apprentices as they pleased, but such instances were rare exceptions. In all other cases the number was explicitly defined. In some trades three apprentices were authorized, but among the greater number of trades only one or two were allowed. It was common, however, to permit an additional apprentice when the older apprentice was in his last year. From the first the sons of masters, and often the sons-in-law, and even the sons from a previous marriage of the wife, were accorded special privileges. The master could always admit his son as an apprentice in addition to the regular number permitted by the guild, and in later years such apprentices were accorded increasing freedom from the requirements which were gradually added to the attainment of mastership. In certain industries where the wife plied the trade with the husband two apprentices could be taken instead of one. In some cases where the son had passed through the apprenticeship and was working with his father, an additional apprentice was allowed. Where the number of apprentices was determined, the length of apprenticeship was also fixed. This varied in different trades from 3 to 12 years. The apprentice was required to pay the master a sum varying from 20 to 100 sous. Sometimes this payment bore a relation to the years of apprenticeship, as for instance, in one of the weavers' guilds the apprentice who served but 4 years paid 4 livres; one who served 5 years paid 3 livres, 6 years, 1 livre, and one who served 7 years paid nothing. Under certain circumstances it was possible for apprentices to buy off a portion of their time, but the master was not allowed to take another apprentice until the full period of his contract had expired. At first the master was permitted to sell or transfer his apprentice to another master, but on account of frequent abuses this was later forbidden by statute. The making of a masterpiece as a requirement for admission to mastership is mentioned only once in *Le Livre des Métiers*, indicating that this feature, which later became so important, was not at first commonly demanded.

As the privileges and strength of the corporations grew, the regulations concerning apprenticeship became more rigorous. In the fourteenth and fifteenth centuries the number of apprentices allowed was often smaller than in the thirteenth, and the time of apprenticeship was often increased. In the fourteenth century the requirement of a masterpiece, consuming much time and often involving costly materials, from candidates for mastership, became common, and in the fifteenth century the practice was practically universal. Such a masterpiece, which was prepared in the household of one of the jurors, was not simply an examination as to the skill of the apprentice, but was an imposition designed to restrict admission to the corporation to a select few.

Even the sons of masters were often required to perform the *chef d'œuvre.* They were, however, commonly freed from the exaction of money payments. Local restrictions against the admission of artisans who had not served their apprenticeship in the particular town are often found. This was especially the case in the city of Paris, where in a number of trades workmen were not allowed to compete for mastership until they had served a number of years in the workshops of that city. This was carried so far in the seventeenth century as to require masters from outside places to make a *chef d'œuvre* before granting them the right of mastership in Paris. Another new element appears in the statutes of some trades in this century, viz. a requirement similar to the practice which had long obtained in Germany that the graduate apprentice should work for a number of years as a journeyman (*valet*) before becoming a master.

In the eighteenth century the corporations had become trade aristocracies in which a few well-to-do masters held a monopoly of trade privileges. All requirements for admission, including the *chef d'œuvre*, which was more complicated and most costly, had become very burdensome. In addition to the money paid by the apprentice to the master, he was obliged to pay also a fee to the corporation.

These conditions made the corporations increasingly unpopular, and certain edicts were passed under Louis XVI looking to the reform of some of their abuses. In 1791 their privileges were abolished by the National Convention. This action, which did away with all legal regulations and restrictions as to apprenticeship, created no substitute, and only the voluntary maintenance of the old customs provided a means of training new workers. A law of 1803 which created a consulting Chamber of Arts and Manufactures contained some articles designed to guarantee the execution of the apprentice contract on the part of the masters. The execution of this law was lodged in the police officials.

By the year 1830 division of labor, machine tools, steam power, quantity production, and capitalist direction, — all the features of the factory system, — were well established. The specialist with a narrow range of training had become an important factor in industry, and thoroughly trained apprentices were fast decreasing in number. An inquiry by the Paris Chamber of Commerce showed that the contract of apprenticeship had neither the importance nor the good consequences that it should have — that only a few contracts were written, and that the conditions were not precise and permitted frequent changes. The law of 1851 attempted to regulate this situation and to lay down legal restrictions as to the contract and to otherwise protect the apprentice by defining the responsibilities of masters as to instruction. The law, however, failed to provide any supervision of the master, and made no provision to guarantee his capacity. As a consequence of this weakness, certain benevolent societies came into being which endeavored to perform this task and to place boys with competent masters.

In 1845 the Municipal Council of Paris, seeking to improve the conditions of apprenticeship, instituted a number of apprentice prizes or subventions. One prize was awarded to a scholar in each of the primary schools for boys and girls in the city. By the terms of this plan the master taking the scholar as an apprentice received 450 francs, of which 200 francs were paid the first year, 150 francs the second, and 100 francs the third year of the apprenticeship. By this arrangement one of the best scholars was each year given the opportunity of apprenticeship under favorable conditions. In 1855 the plan was modified so as to apply rather to the poorer boys and to those deemed best fitted for apprenticeship rather than to the brightest scholars. Under these conditions the measure fell into disrepute, and was discontinued in 1872.

In France more than in any other country the effort has been made to develop not only technical and art schools supplementary to apprenticeship, but schools actually to perform the function and take the place of apprenticeship. From the first the policy of the French people has been to effect these results mainly through public schools controlled by the central government. See INDUSTRIAL EDUCATION; TECHNICAL EDUCATION; FRANCE, EDUCATION IN.

Germany. — Up to the beginning of the nineteenth century the guilds in this country had acquired and exercised great power. The movement to transmute the guilds from powerful autocratic bodies into legal corporations began in Prussia in 1810–1811. By the law of 1869 all guilds were changed into free corporations (*freie Innungen*), which had no power to compel members to join, and consequently could only regulate for apprentices of their own members. The free corporations, however, have gradually acquired considerable influence, and while they cannot interfere with the freedom of their members in their vocations, they can and do regulate the system of apprenticeship. A more recent development has been the passing of a law empowering those who follow the same calling within any town or district to form compulsory corporations (*Zwangsinnungen*) by agreement of a majority. Such corporations have tended to increase. An important function exercised by them has been the regulation of apprenticeship, the establishment and support of continuation and professional schools (*Fachschulen*), the holding of professional examinations at the end of the period of apprenticeship and for admission of journeymen to the status of masters. By law (*Reichsgewerbeordnung*, 1900 § 127) all indentures for apprenticeship must be completed in writing within four weeks after it has been entered upon. The contents must set forth: the trade concerned or its branch, the duration of the period of apprenticeship, the premium, the agreement (if any) to provide board, lodging, sick pay, etc., the conditions under which it can be resolved. The indenture is to be signed by the employer and parent or guardian of the apprentice. The employer is bound to instruct the apprentice in anything pertaining to the trade, to compel his attendance at school and supervise his work, to exercise a moral influence over him and stimulate him to industry and diligence. The duration of apprenticeship must be at least three years and not more than four. At the end of the stipulated period the apprentice must be examined by a commission appointed either by the corporation of the trade or by the local chamber of trades, a body representing several corporations.

So far as the education of the apprentices is concerned, the most obvious feature in Germany during the last half century has been the provision by the State of special continuation and technical schools and the compulsion exercised by the State over employers to permit the attendance of their apprentices and young employees. Particularly is this fact true of Saxony, Bavaria, Baden, and Würtemberg. In Prussia there is a permissive law giving power to towns which desire it to provide compulsory technical schools. So far as the state system is concerned, and that includes the greater part of the provision of facilities for apprenticeship education, it will be treated under separate titles (see GERMAN EMPIRE, EDUCATION IN; CONTINUATION SCHOOLS; TECHNICAL EDUCATION; etc.).

But considerable private effort remains, particularly in the north. Not only do the corporations (*Innungen*), which include journeymen in many cases as well as master workmen, support local public schools, but many maintain their own schools. Thus in Berlin the Merchants' Association (*Kaufmannschaft*) maintains some six schools to provide continuation and commercial education for apprentices and young employees. The Tailors' Association also maintains an interesting apprenticeship school under the supervision of a committee. All the instructors, except in mathematics, are master tailors or cutters and designers in large houses. The pupils, who are between 15 and 18, attend the course in winter, twice a week, for four years. Similar schools are maintained by the Tinsmiths' Association and the Bootmakers' Association.

While the system of private training on the premises of the employer was the rule, it is now the exception, and is found only in large concerns. Thus, the clothing establishment of Herzog in Berlin selects for special training a few of the apprentices for important positions in the business. A large firm of locomotive manufacturers in the neighborhood of Berlin makes similar provision for the training of its apprentices, who in most cases are already graduates of one of the secondary schools.

On the whole it may be said that in Germany, as in other countries, apprenticeship education in the workshop is being replaced by regular instruction in schools of different types, which are more and more coming under state control. The employers find it to their interest to accept the state regulations for the compulsory attendance of their young workpeople in technical schools for a certain number of hours each week. The combination of workshop and school is the contribution of Germany to the problem of training apprentices.

Switzerland. — The German system of school and shop training has been adopted in Switzerland. The shops are supplemented by industrial continuation schools, handicraft trade schools, intermediate technical schools, and technical high schools. Grants made to cantons, communes, and private school committees may amount to one half the total annual expenditure.

Legislation for Education of Apprentices. — The federal government has passed no general law governing the education of the apprentice except to forbid the employment of children in factories under 15 years of age and to restrict the hours of labor for workers under 16 years of age to 11 per day, but the Canton of Zurich passed an Apprenticeship Law in 1905 containing the following provisions: —

(Section 5) The master shall be bound to instruct the apprentice to the best of his ability either in person or through a reliable representative. (Section 11) The master is bound to allow the apprentice at least four hours weekly out of his legal working hours to attend classes for trade instruction or general education if such opportunity is available in the vicinity. (Section 16) The right to have apprentices may be withheld from persons found guilty of gross neglect of duty to his apprentice or for moral unfitness. (Section 19) Every apprentice at the end of his period shall be summoned by his master to undergo a test to prove his ability and technical knowledge of his trade. *N.B.* The examination expenses are borne by the Canton. (Section 23) To successful apprentices a certificate of apprenticeship shall be issued. (Section 30) Infringement of this law punished by a fine not exceeding (40 dollars).

The Apprenticeship Act of the Canton of Basle (1906) contains similar provisions to that of Zurich. (See further SWITZERLAND, EDUCATION IN.)

United States. — Since the term "apprentice" is loosely used to designate almost any shop learner or employee below the journeyman, it is important to point out that fundamental to true apprenticeship is the *indenture*, a legal instrument, in the terms of the laws of New York, " whereby a minor is bound out to serve as a clerk or servant in any trade, profession, or employment, or is apprenticed to learn the art or mystery of any trade or craft." An indenture implies mutual obligation of service in preparation for a definite occupation, and apprenticeship is therefore a sharply defined and strictly limited type of vocational education. The variations in the type are many; yet they may reasonably be classified into two main groups: the old apprenticeship, in which there were close personal and even domestic relations between master and apprentice, with little, if any, provision for definite education; and the new apprenticeship, in which the personal element has practically disappeared, but in which there is a continually growing emphasis upon both intensive and extensive training.

At no time has apprenticeship failed to have some footing in the United States. The old form, reaching its maximum in the early nineteenth century, steadily waned as the factory system grew, and, while still existent, has been of little importance since the Civil War. The new form, having its rise in the exigencies of certain industries, has been steadily making way, during the last fifty years, against indifference and prejudice, until to-day it finds itself one of the major means through which the fast growing demand for adequate vocational education seems likely to be met.

> " Not only here in the United States is the apprenticeship system in process of being resuscitated along expansive lines, in order to meet modern conditions of production in great manufacturing establishments, but many countries in Europe have for some years been perfecting this process, coördinating the apprenticeship system with general trade and industrial instruction." — WRIGHT, *The Apprentice System*, p. 19.

The apprenticeship of colonial days and of the earlier years of the national existence was that of the Old World, and exhibited like advantages and evils. Among the advantages was the direct association of the inexperienced youth with the skilled master versed in his special trade and imparting all its practical details to the apprentice. Where the master was not only efficient, but conscientious, the apprentice doubtless secured the best possible acquaintance with the ramifications of the trade. Domestic intercourse with such a type of master was also of high educational value. On the other hand, the length of the indenture — usually seven years, or until the apprentice came of age — was then, as it would be to-day, altogether too great. Consequently, a large part of the time of the apprentice was necessarily given to matters in no way connected with the industry itself. He was employed in sweeping out the shop, taking care of the horses and wagons, doing household chores, and running errands for all the members of the master's family. A typical example given by Mr. E. P. Bullard, Jr., in an address before the National Society for the Promotion of Industrial Education (*q.v.*), outlines the duties of an apprentice bound to a coach-lamp maker: —

> "He had to get up out of bed at half-past four in the morning, sweep out the shop, then build the kitchen fires for the lady in the house, had to sweep the house afterwards and do any other work around the house that was required, had to take care of the old man's horses, and along in the afternoon, sometimes, not always, he had an opportunity to go and see how they made coach-lamps."

The indentures were often strongly obligatory on the side of the apprentices, but not so on the side of the master. (This lack of obligation on the part of the master, while frequent in the indentures of the early period, was not universal. Many contracts used the words " and the said master on his part doth hereby promise, covenant and agree to teach and instruct said apprentice or cause him to be taught and instructed in the art, trade or calling of . . . by the best ways and means he can.") The indenture of the apprentice referred to above read: " The master shall endeavor to teach or cause to be taught said apprentice." The master could claim, therefore, fulfillment of the obligation, if he showed an attempt on his part to teach. The compensation, moreover, was always very small. In this particular instance the master was to provide the apprentice

> "with sufficient meat, bunk and lodging and to pay him twenty-five dollars per year and furnish his clothes."

Suited to small and scattered industries and to the semi-domestic crafts, the old apprenticeship system was wholly inadequate to the conditions of a modern factory, and was destined, therefore, to decay. Throughout the two centuries of its actual existence in the American Colonies and the United States, it labored, moreover, under peculiar difficulties. The pioneer youth was naturally restless under provisions which tied him down, unless by extraordinary labor he could " buy his time," till his majority, and under laws which classed him with servants and with slaves. Where opportunity for independent activity was so easy, where personal liberty was so jealously guarded, and where the very atmosphere was one of change, only a relatively small proportion of young men could be found voluntarily to assume obligations which were always uncertain, generally unfair to the apprentice, and from which it was difficult and expensive to escape. It is not hard to see, then, why many, if not most, of those early apprentices were either public charges indentured by the parish without regard to their personal wishes in the matter, or orphans taken care of by their guardians in this easy way.

As pointed out by Dr. Motley in *Apprenticeship in American Trade Unions*, the laws relating to apprenticeship in the United States recognized two purposes: one industrial, that every boy of the artisan class might learn a trade under conditions favorable to the master; the other philanthropic, that there might be " guaranteed to poor, unfortunate or neglected children the opportunity to learn a trade so that they might in time become useful citizens and not public charges." Neither purpose furnished a very attractive motive for apprenticeship to American youth.

With the great manufacturing evolution which had its rise in the middle part of the nineteenth century, and the main features of which were the rapid introduction of labor-saving machinery and the resulting subdivision of processes, came, naturally but gradually, the dying out of a never very deeply seated and a now no longer effective method of industrial training. On the statute books, however, the early laws were retained for many years after new methods had been inaugurated in practice; and while it is often stated that "the apprenticeship system is dead," yet even to-day, isolated though not infrequent, instances may be found of the employment of apprentices under practically the old forms of indenture.

The process of finding and adopting substitutes for this moribund system was neither rapid nor easy. As early as 1850 manufacturers were complaining bitterly of the scarcity of skilled labor; and the rapid industrial development following the Civil War made this question even more acute. The blindness of the manufacturers of that period, both to the need and to the nature of industrial education, and the fear of the worker lest the labor market be over-supplied, united to make experimentation cautious and development extremely slow. This was particularly true as regards the growth of the "new apprenticeship"; for into this phase of vocational education enter complicated elements due to trade unionism, to specialization of processes, to mobility of labor, and to the personal equation. From their beginning the unions have guarded with most careful regulations the nature and number of apprentices; in the high specialization of manufacturing processes there is bound to be conflict between the employer who wants the increased output which comes from holding an employee to a simple process and the workman who desires to get an extensive range of skill; in view of the well-known tendency of American workers to migrate, hoping to better their condition, the manufacturer hesitates to train apprentices only to see them employed by his rivals; while the factory system itself makes it exceedingly difficult to secure to the apprentice right teaching or to guard him from petty tyranny at the hands of those in whose charge he must be placed. Not only has there been disinclination on the part of the average foreman really to teach the apprentice, but the former's striving for efficiency has led him, for economic reasons, to keep the apprentice at a single process. Skill in such a special process, moreover, commands higher wages, and has therefore given the apprentice himself a powerful incentive to stick to that single activity without regard to the ultimate effect upon his mental condition or his material future.

Despite these difficulties, the demand for skill has been so pressing that many establishments, especially in the machine-building trades, have given much study and experimentation to the problem and have evolved therefrom differing, but usually effective, systems of apprenticeship. In the infinite complexity of modern industry it is evident that no one method will suit all cases. Certain industries have machine-tending operations in which very slight skill and training are necessary; in others a few expert directors are sufficient to control a large body of unskilled labor; while others require not only high technical efficiency, but also, because of rapid evolution, unusual adaptability. The manufacture of engines, locomotives, or intricate and delicate tools, for example, demands large numbers of such highly expert workers.

Carroll D. Wright, in his report on the *Apprenticeship System in its Relation to Industrial Education*, estimating that there are in round numbers 225,000 manufacturing establishments in the United States, says: —

> "It is impossible without taking a census of the whole number to ascertain how many have adopted any form of apprenticeship, but from all that can be learned, there must be many, many thousands."

In the *Report of the New York Bureau of Labor Statistics for 1908*, the number of apprentices per 100 employees of high-grade skill is given as 4.8. If this percentage holds for the other manufacturing states, it is evident that apprenticeship is an important force in industry. Moreover, in a *Report on Industrial Education*, published in 1910 by the American Federation of Labor, we find these statements:—

> "It is of more than passing interest to note that the revival of apprenticeships by large corporate interests through comprehensive and sane regulations is gradually taking form. With the growing feeling that the old-time apprenticeship system must be modified to meet modern conditions of life, there looms up the question of a substitute which shall keep the best and most necessary of the older customs, and meet modern requirements. It is further recognized that the old apprenticeship system possessed many features that were uneconomic and unjust, but with the preservation of much that was good and its application by proper blending with the modern idea of perfection in theory, it would lead to more satisfactory results. A marked tendency towards apprenticeship is taking place, and the feeling expressed by both employer and employee is that a gradual return will take place if such training is conducted sanely and advantageously to the American Youth."

This revival of apprenticeship is proceeding, roughly speaking, along four main lines. The first is where the industrial establishment and the school system coöperate in the education of the apprentice, practice in the shop being supplemented and illuminated by cognate school study of mathematics, drawing, physics, chemistry, etc. The second is where the employer provides such school exercises within his own establishment. The third is where the industrial establishment recommends or requires school study without making any provision, direct or through affiliation, for such supplementary training. The fourth is where the apprenticeship training is practically concentrated upon a single process or range of processes for the purpose of securing specialized skill.

These varying forms are best illustrated by specific instances. These are given, however, without prejudice to similar, equally effective, examples, which, for lack of space, must be omitted. Perhaps the most striking instance of the first type of apprentice-training, the coöperative plan, exists in Cincinnati, where the University of Cincinnati has engineering courses of six years' duration, during which the students work alternate weeks in the shops of the city throughout the scholastic year, and through the summer on full time. The practical work at the shops is as carefully planned as the theoretical work at the university, and in all cases the students follow as nearly as possible the path of the machine from the raw material to the finished product. The students are paid for their services on a scale of wages beginning at 10 cents an hour and increasing at the rate of 1 cent an hour about every 6 months. The total earnings in the 6 years amount to about $2000. This plan has had over three years of successful operation, and has received the highest commendation from the manufacturers of the city. Moreover, under the initiative of the Cincinnati branch of the National Metal Trades Association, this coöperative plan has been extended to the high school, the plan being to furnish the manufacturers with skilled mechanics for the shops.

Instances of the second type, in which shop and school are intimately associated, are the General Electric Company of Lynn, Mass., the New York Central Lines, the Grand Trunk Railway, and other railroads, the Ludlow Manufacturing Associates of Ludlow, Mass., the Westinghouse Air-Brake Company of Pittsburg, Penn., the Southern Bell Telephone Company of Atlanta, Ga., the William Tod Company of Youngstown, Ohio, the George V. Cresson Company of Philadelphia, Penn., and the Yale and Towne Manufacturing Company of Stamford, Conn. To quote from M. W. Alexander, Supervisor of Apprentices of the General Electric Company, at Lynn, Mass.: —

> "The training room is simply a part of the whole factory set aside for the purpose of training apprentices, and is provided with a complement of machines and tools, and the most instructive work that the factory contains at any time." "The apprentice remains in the training room for a period of about a year and a half to two years, . . . and during that time is given an opportunity to work with the different machines and tools and to perform different operations on a variety of work. . . . The apprentice is transferred from the training room at the end of about two years to different departments of the factory. A school has been established in connection with the apprenticeship course, in which instruction of an eminently practical character is given for the purpose of supplementing and amplifying the practical work of the shop. Each apprentice is obliged to spend six hours a week out of his regular time of employment in the classroom, during which time he receives the same wages as if he were working at the bench or at the machine. The teachers in the classroom are selected from the staff of engineers, draftsmen, and foremen of the company, and devote part of their time to the work of teaching. They are chosen in preference to professional educators on account of their intimate knowledge of the needs of the factory and the industries in general. Their work covers instruction in that branch of mathematics, physics, engineering and mechanical drawing which is a necessary part of the equipment of a skilled artisan.

In the New York Central Lines and other railroads, the relation between practice and theory is even closer, drawing, mathematics, etc., being based wholly upon shop problems which must be worked out by the individual apprentice according to his ability.

Instances of the third type of apprenticeship are the R. Hoe and Company's School, where the young employee in the shops pursues evening courses, conducted outside the establishment but devised to furnish knowledge of things relating to the work in which he is engaged; and the Brown-Ketcham Iron Works of Indianapolis, Ind., which give six months' time on their apprenticeship to those boys who follow the course of instruction in a special night school organized by the Y.M.C.A.

It is evident, however, that where the industry involves many operations and processes, there must always be a strong tendency to use the time and capacity of a boy in thoroughly mastering the special details of a single department. The National Association of Machine Tool Builders has adopted a system of indenturing apprentices to a single department for terms varying from one to two years. While this secures special skill, it does not enable the apprentice to learn the trade as a whole. To quote from a letter explaining this fourth plan:

> "It was the custom in the saw trade originally to indenture apprentices and bind them for four years' apprenticeship at very small wages, and boys so indentured were taught every branch of the business. In this present day of specialization, a boy apprenticed to the sawsmith's trade is limited entirely to the work of straightening and tensioning saws of all kinds. The practice of instructing apprentices has not been given up entirely, but the work in a saw factory is so specialized in these days that an apprentice boy learns only one special part of the work. They are taken on as apprentices at sixteen or seventeen years old, and they serve four years under instruction, at the end of which time they are entitled to journeyman wages, and are given certificates of graduation, as it were, in their particular branch of the business."

Of such specialization Mr. Higgins of the Norton Company of Worcester remarks: —

> "Specialization is both a good thing and a bad thing. It is good because it enables the individual who is low in opportunity and outlook to get a footing in the field of productive life, so that he becomes quickly self-supporting and has entered a career that is ever open at the top. . . . The system of narrow specialization is bad whenever the individual is induced to take a short cut and be a narrow specialist when he might have done better by a broader all-round training."

Col. Wright defines the proper apprenticeship system as one that " will guarantee to the boy the opportunity of learning his trade as a whole at a fixed wage with a steady increase."

The Fore River Ship Building Company of Quincy, Mass., has mapped out careful courses of instruction for apprentices in more than a dozen specific lines. It is interesting to note these divisions, which include special instruction for blacksmiths, coppersmiths, electricians, ship-carpenters, pattern-makers, joiners, riveters, ship-fitters, anglesmiths, sheet-iron workers, etc. The Brown and Sharpe Manufacturing Company of Providence, R. I., have special instruction for core-makers, ironmoulders, machinists, and pattern-makers. In these companies the apprenticeship agreements vary in accordance with the special branch of work to be pursued by the apprentice, and they all serve as excellent illustrations of what is called the "special apprenticeship system."

A practically unique form of apprenticeship training is that furnished by the Williamson Free School of Mechanical Trades. Under the foundation deed: —

> "All scholars admitted to the school shall be fed with good, wholesome food; plainly, neatly and comfortably clad, and decently and fitly housed and lodged. They shall also . . . be thoroughly instructed and grounded in the rudiments of a good English common-school education, embracing spelling, reading, writing, arithmetic, grammar, geography, history, particularly of the United States, and also such of the natural and physical sciences and lower mathematics as in the opinion of the Trustees it may be important for them to acquire to fit themselves for the trades they are to learn. . . . I expressly direct that each and every scholar shall be compelled to learn and be thoroughly instructed in one good mechanical trade, so that when they leave the school on the completion of their indentures they may be able to support themselves by the labor of their own hands."

Another rather unusual form is that prosecuted by the Printing School of the North End Union, in which the coöperation between the master printers and the school is so close as to make the latter virtually an adjunct to the printing establishments themselves.

So far consideration has been had only to the employer and employee. As has been suggested, however, trade unionism has been a large, if not a controlling, factor in the whole modern development of apprenticeship. As a general rule, the trade unions have undertaken to determine apprenticeship regulations. In the early days of unionism, local conditions naturally defined the apprenticeship rules. Limitation of the number of apprentices was very common, on the ground that the introduction into a trade of a large number of trained apprentices would cause a lowering of wages. The problem, and the attitude of organized labor, is fairly stated in the report on *Industrial Education* (1910) of the American Federation of Labor: —

> "The problem of industrial education and trade training is made very complex by the present system of specialization, and unless great care is exercised the exploitation of boys who desire to enter upon a career as skilled craftsmen is probable. A proper apprenticeship system which will guarantee to the youth the opportunity of learning his trade as a whole is very much desired. One of the disadvantages of many apprenticeship systems is that establishments have become so large and with so many departments with their divisions and subdivisions and processes that the time of the boy is fully employed in mastering details of one department to the exclusion of all other departments. Public industrial schools or schools for trade training should never become so narrow in their scope as to prevent an all-round shop training. The action of the National Tool Builders' Association in boldly stating that they expect to train specialists will do more to call to the attention of the public the necessity for broad industrial training before the age of seventeen than any other procedure, hence a vital question to be considered is how best to provide for the future entrance into skilled trades without overcrowding them, and finally the problem is of so training the workers that they become the best kind of workers the world produces and at the same time develop conditions which go with increased efficiency, increasing wages, and increasingly better living conditions."

There have almost always been serious differences regarding apprenticeship between the employers and the unions, especially in connection with the limitation of numbers. A strong union would succeed in enforcing its regulations, while employers would overrule the weak. Of late years, however, conciliation has been the moving principle in all disputed questions, and apprenticeship regulations have been determined by joint boards.

> "Of the 120 national and international trade unions with a total of 1,676,200 members affiliated in 1904 with the American Federation of Labor, 50 unions with a membership of 766,417 do not attempt to maintain apprenticeship systems. The remaining, together with about half a dozen unaffiliated, national unions, try more or less successfully to enforce apprenticeship regulations. The majority of the unions in which apprenticeship is not a prerequisite to membership are composed of members who perform unskilled labor. Ordinary intelligence and physical strength are the qualities chiefly required from these workers." — MOTLEY, *Apprenticeship in American Trade Unions.*

The purposes of apprenticeship rules are primarily a shorter working day, an increased wage, and more favorable conditions of employment, these being the ends aimed at by unions and apprenticeship regulation being the machinery used to attain these ends. Admission to the union is the final step in apprenticeship, special inducements being offered to secure such entrance.

> As stated further by Dr. Motley: "The apprenticeship system in nearly all the unions is, however, unsatisfactory. . . . This may be attributed to three general causes: (*a*) the large influence of local unions in determining apprenticeship rules; (*b*) the effect of changes in business organization and industrial technique; (*c*) the disregard of apprenticeship rules both by employers and the unions." He continues, however: —
>
> "The most promising tendency in the direction of bettering the conditions of apprenticeship is found in the fact that apprenticeship regulations are in an increasing number of cases formed by joint agreement between the employer and the union, and not, as formerly, by the union or the employer alone. . . . The acceptance of the agreement by employers and unions tends to concentrate the best thought of both parties upon the subject, with the result that in many instances elaborate and efficient rules have been jointly enacted and enforced."

In view of this changing attitude of both employers and labor unions, and in view, moreover, of the success of such experiments as that at Cincinnati and those upon many of the railroads, it would seem safe to predict that apprenticeship education will occupy an increasing place in vocational training, and that, in this development, it will follow substantially two main lines, — one leading towards closer coöperation between public education and industrial establishments; and the other tending towards an intensive, practical, but nevertheless broad, apprenticeship training conducted, within the establishments themselves, by men who are educators as well as experts in their special fields. J. S., C. R. R., I. L. K., AND J. P. M.

See articles on INDUSTRIAL EDUCATION; TRADE UNIONS AND EDUCATION; TRADE SCHOOLS; VOCATIONAL EDUCATION; etc.

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APPRENTICESHIP EDUCATION UNDER THE POOR LAW. — See POOR LAW and EDUCATION.

APRAXIA. — A kind of aphasia (*q.v.*), in which there is an inability to appreciate the forms of objects and to properly use them. The objects may belong to any field of activity, *e.g.* pen or pencil, knife or fork, hammer or saw, table or chair, etc., and be sensed by means of any of the sense organs.

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APROSECHIA NASALIS, called by French and English writers **APROSEXIA NASALIS** (ἀ-προσεξία, inattention, and *nasalis*, nasal). — This term was invented by Guye to indicate the form of inattention that is apt to occur in case of children suffering from adenoid growths. The child is apt to be dull, listless, unable to accomplish satisfactory school work, and sometimes distinctly stupid. The effect of an operation removing the adenoid is usually great improvement of the power of attention and of the mental ability generally.

See article on ADENOIDS.

APTITUDE. — Mental capacity, native or acquired. An aptitude is that part of a person's mental equipment which gives him a special fitness for any kind of endeavor. Such an aptitude may be the result of either an innate endowment or of special training, or both.

Individuals differ greatly in their gifts and capacities, such differences being both quantitative and qualitative. Thus in general there are three classes of individuals, differing quantitatively with respect to their general mental equipment. They are the talented or gifted persons; the average person, or person of medium ability; and the subnormal. Within each of these classes there are various subclasses. This is especially true of the last class, which comprises those who are weak-minded and those who are merely lacking in mental ability though below the average in capacity. The former are still further subdivided into the idiots and imbeciles, who differ somewhat in the degree of their mental ability.

The mental and physical qualities giving rise to differences in aptitude are difficult to distinguish. Apparently differences in the purely sensory basis of the mental life are comparatively insignificant, as is shown by the fact that many persons deprived of some of their senses reach a high degree of mental development. On the other hand, it is probable that a natural tendency to emphasize the *reproduced* elements of one or another of the spheres of sense may be at the basis of many aptitudes which express themselves in choice of callings and talented performance. Fundamental differences of this sort, for example, are often at the basis of the high degree of perfection attained by artists, musicians, etc.

Another fundamental group of differences in mental qualities are differences in attention which to a large extent govern a person's mental aptitudes. The type of a man's attention (distributive or intensive, etc.) has undoubtedly a great influence upon the direction taken by his mental development. E. H. C.

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AQUATICS or WATER SPORTS. — See Athletics, Educational; Rowing; Swimming; Water Polo.

AQUAVIVA. — See Jesuits, Educational System of.

AQUINAS, ST. THOMAS (1225–1274). — The greatest and most influential philosopher of the Middle Ages. He studied first at the Benedictine monastery of Monte Casino, and, later, at the University of Naples. After his entrance into the Dominican order in 1243, he became a pupil of Albert the Great (*q.v.*) at Cologne and at Paris. In 1251, he began to teach at Paris, but did not obtain his license as Magister, or Doctor, until 1256. Between the years 1260 and 1270, he taught at Rome, Bologna, Viterbo, Perugia, and Naples. His greatest work, a summary of Catholic philosophy and theology entitled *Summa Theologica*, begun in 1271, was left incomplete. Besides this, he wrote a more popular controversial or apologetic summary, *Summa Contra Gentiles*, various theological and philosophical *Opuscula*, special treatises (*Quaestiones Disputatae*), commentaries, exegetical works, etc. The best editions of his *Opera Omnia* are the Roman of 1570, the Parma edition, 1852–1859, the Paris edition, 1875, the New Roman, or Leonine, edition, 1882 ff., of which 12 volumes have been published up to date.

St. Thomas attained very widespread fame as a teacher of philosophy and theology. His method did not differ essentially from that of the monastic teachers of the early Middle Ages. He expounded and commented on a text, using in his philosophical course the text of Aristotle (a special translation was made at his request directly from the Greek by William of Moerbeke (*q.v.*) about 1260) and in his theological courses either the Latin Vulgate translation of the Bible or the *Books of Sentences* of Peter the Lombard (*q.v.*). His manner of treating these texts was, however, original, and even novel to the point of arousing the opposition of the reactionaries of his day. "He was original," writes his disciple William Tocco (*Acta Sanctorum Martii*, Vol. I, pp. 661 ff.) "in the subjects which he introduced into his lectures, in the manner in which he drew his conclusions, in the reasons which he gave for his conclusions; nay, he did not hesitate to teach and to write new opinions." This originality of manner and matter attracted unfavorable attention on the part of his rivals and opponents in the great struggle between the "regulars" and "seculars" which threatened to disrupt the University of Paris during the thirteenth century. He was attacked also by the Franciscan teachers, headed by William of Lamarre. In 1277, three years after his death, the two greatest universities of Christendom, Paris and Oxford, condemned certain of his teachings. He had, however, defenders as well as opponents. In 1278, a General Chapter of the Dominican order held at Milan approved him as a teacher, and before the end of the century his doctrines were generally acknowledged as unassailable from the point of view of orthodoxy. His authority as a teacher grew during the fourteenth and fifteenth centuries. His works received special commendation from Councils and Popes, until in our own day he was proposed by Pope Leo XIII as patron of Catholic schools throughout the world, and his writings prescribed as a text in Catholic colleges, seminaries, and universities.

Among the works of St. Thomas there is none which treats in an exhaustive manner of the principles of education. In the commentary on the *Politics* of Aristotle, he accepts the Stagirite's principles in regard to the educational function of the state. The treatise *De Magistro*, incorporated in the *Quaestio Disputata de Veritate*, is theological and philosophical rather than pedagogical. It is divided into four articles. The first inquires whether one man can teach another and so be called "Master," or whether this title belongs to

God alone. The second article discusses whether one may be said to be his own teacher. The third takes up the question whether man may be taught by an angel. The fourth is devoted to the question whether teaching belongs to the active or to the contemplative life. Here, as elsewhere in the *Quaestiones Disputatae,* the contents of the tract are determined not so much by the requirements of a strictly logical division of topics as by the immediate needs of the controversy which had arisen in the schools. The question to which the first article is devoted is discussed also in the *Summa Theologica,* Ia, CXIII, Art. I. In both places St. Thomas expounds a view which recalls the Socratic doctrine of development. There are, he says, in the human mind, as it were, seeds of knowledge (*quaedam scientiarum semina*), general principles, which contain potentially the more definite knowledge of particulars. The function of the teacher is to propose general principles to the mind of the pupil, who, by the natural light of reason, perceives them to be true, and then to aid him in passing to particular applications. Thus the process of teaching follows the path mapped out by nature itself; for teaching is an art, and the first canon of art is to follow nature.

Among the *Opuscula* is a letter addressed to a student who had inquired what is the best way to acquire knowledge, human and divine. St. Thomas answers in a brief summary of the dispositions, mental, moral, and spiritual, which are requisite for the acquisition of knowledge. Among the counsels which he gives is this: Begin by what is less difficult and so proceed by easy stages to more difficult questions: do not enter at once into the sea of knowledge, but approach it by the streams that lead to it. (*Opusc.* LXI, in Paris edition, Vol. XXVIII, pp. 46 ff.) The Opusculum *De Eruditione Principum,* which, however, is of doubtful authenticity, contains a lengthy discussion of the duties of parents in regard to the education of their children, and enumerates the qualities which a teacher should possess. These last are reduced to five: ability (especially originality), correct living, humble knowledge, eloquence, and skill in teaching (*peritia docendi*). Skill in teaching is conditioned by a talent for clearness, the ability to be brief without being obscure, an appreciation of the useful, kindness (*suavitas*), and deliberateness (*i.e. mediocritas inter velocitatem et tarditatem*). The requirements on the part of the learner are, likewise, treated at length. Throughout the discussion there is an interweaving of intellectual, moral, and spiritual considerations (*Opusc.* XXXVII, in Paris edition, Vol. XXVII, pp. 551 ff.).

W. T.

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ARABIC EDUCATION. — This subject is chiefly of interest to students of Western civilizations from the fact that it contributed to illumine the period of the so-called "Dark Ages." It was essentially Greek rather than Arabian in character and origin. It is true, indeed, that the early or Bedouin period of the Saracenic people was adorned by a certain indigenous culture. Arabic poetry originated in a period of most remote antiquity; and the *Kitab al-Alghani,* or *Book of Songs,* contains a store of information of pre-Mohammedan culture. But the coming of Mohammed, in 571, gave a new character to the Arabian civilization, sounding a note of war against the infidel which accompanied the banner of Islam throughout Western India, northern Africa, and Spain. Spain was completely conquered, except for the Christians who remained in the mountains, by 715 A.D. In the East, the rise of the Abbasid dynasty, which involved the removal of the Khalifate from Damascus to Baghdad, inaugurated a new and brilliant period of civilization.

The Abbasids made a deliberate attempt to extend and popularize education. Under their patronage a diligent search for books, and a systematic process of translating foreign writings, was instituted. Syrian monks had long been engaged in the translation of Greek works into Syriac; and now the Nestorians, an exiled and persecuted sect of Christians, were employed to make Arabian versions from the Syriac for the khalifs. Carrhae, the Haran of the Scriptures, became a celebrated center of astronomical and scientific knowledge. Each mosque established a public school for reading and writing the Koran. It is said that over one thousand students attended the medical college, hospital for clinical instruction, and chemical laboratories of the second of the Abbasids. One even hears of a Nestorian as "superintendent of public instruction."

An impetus was given to the cause of education in 786 by the accession to the Khalifate of Haroun-al-Raschid, whose efforts on behalf of enlightenment were only surpassed by those of his son and successor Al-mamum. Both caused mosques and academies to be built; Al-mamum founded a university, a library, and an observatory at Baghdad, proceeded to accept books and even pictures and maps as tribute, endowed professorial chairs, assisted indigent students, bought rare instruments and manuscripts, and addicted himself to study. About this time was effected a famous translation of Ptolemy's Geography and Astronomy, under the name of the *Almagest;* and translations were also made of Aristotle's *Categories* and

Poetics, Plato's *Republic* and *Timæus*, the *Elements* of Euclid, and the works of Galen on medicine. Meantime, in the way of indigenous literature, history was voluminously represented by a mass of rather superficial and credulous chronicles. Romance of a strictly native and Eastern character appeared in the *Thousand and One Nights* and other tales, which seem to have originated in Baghdad probably in the course of the eleventh century.

The Moorish conquerors of Spain were divided in their aims and ambitions; and it was not until the establishment of Abelu-r-rahmen I on the throne of an independent Spanish Khalifate that order, civilization and learning became concentrated in this region of Europe. From the ninth to the eleventh century, Spain was the principal seat of Western culture. From the educational point of view, it is not perhaps the palaces, mosques, public baths, aqueducts, market places, street lamps, and street pavements of the period that ought to claim attention; nor yet such luxuries as flowers, gold, silver, ivory, marble, citron, and sandalwood, pearls, crystal, and lapis lazuli brought from abroad; nor the paintings, chandeliers, perfumes, fountains, stained glass windows, mosaic floors, and hot and cold water frequently to be found in the houses; but rather the libraries, schools of the mosques, and universities that attract our involuntary attention and admiration. Many of the teachers were Jews. It was fashionable for men of power and wealth to collect manuscripts and place their libraries at the disposal of scholars. In particular, the Khalif Al-hakem II (961-976) assembled copyists and bookbinders, encouraged learned men at his court, and is even said to have collected 600,000 volumes for his magnificent library. Cordova was perhaps the most enlightened city of the world, being splendidly rivaled by Toledo, Granada, and Seville.

The field of Mohammedan learning from the ninth to the eleventh centuries, if one may omit the study of the Koran as not bearing closely upon European development, comprised two principal parts, practical science and philosophy. Arabian mathematics were based upon the Greek, but profited by the introduction of Hindu numerals. The Arabians improved the method of solving quadratic equations; and added to trigonometry the use of sines for chords, tables, and formulæ. Arabian geometry was based upon the Greek, but the algebra and the arithmetic drew upon Hindu sources. They developed an astronomy, or astrology (*q.v.*) more accurate than that of the ancient Greeks, though their success was principally due in the first place to a knowledge of the Ptolemaic system. Al-Batani of Syria, 879-920 A.D., was most celebrated for the exactness of his astronomical calculations. The first astronomical observatory in Spain may have been that constructed in 1196 by the Moor Geber at Seville. Arabic algebra was primarily derived from India; Arabic geometry from Greece. In geometry the Arabians fully appreciated the Greek masters Euclid, Apollonius, and the others, and made practical applications of their knowledge to *hydraulics*. They used sighted tubes to observe the stars, knew the earth to be round, measured a degree of latitude, computed the angle of the ecliptic, made a close determination of the length of the year, taught geography by means of globes, and named many of the stars. Western Europe still retains the Arabic terms algebra, azimuth, zenith, nadir, etc.

Medicine was a fundamental subject of study among the Arabians. Most of the sciences were subordinated to it; and even astrology was pressed into its service. Although the prohibitions of the Koran restricted anatomical investigations, even dissection was practiced more or less in Spain. The earlier medical texts were translations from the Greek, and followed Hippocrates and the Alexandrians. Physicians were required to pass an examination before being permitted to practice. Diet, drugs, and diseases such as fevers and leprosy were thoroughly studied. Chemistry came to be studied in connection with medicine and particularly in relation to the search for the elixir of life, as well as the philosopher's stone. The khalifs were liberal in the support of laboratories as well as libraries. Geber discovered nitric acid and *aqua regia;* Rhazes discovered sulphuric acid. Substances were reduced to their constituent elements, and the properties of gases investigated. In physics it was Alhazen who corrected the mistaken theories of sight that had been formulated by the Greeks, and showed the relation of the eye to rays of light. Studies were also pursued in problems of gravity, capillary attraction, and the weight and velocity of bodies. One may also recall that the skill of the Arabians in metal work was amply attested by their bitterest foes, the Crusaders; and that they excelled in all manner of fine workmanship.

Arabic philosophy preserved the unfettered forces of Hellenic genius during their long period of partial exile from the intellectual life of western Europe. It was founded principally upon Aristotle (*q.v.*), but influenced also by the Neo-Platonic (*q.v.*) and Hebrew philosophies. Avicenna (*q.v.*) (980–1037) before he was seventeen years of age had read parts of Aristotle, it is said, forty times over; but it was the Spanish Moor, Averröes (*q.v.*) who became the medium whereby a practically complete possession of the works of the great Greek master came to enrich the thought of medieval Europe. In the twelfth century the principal works of Aristotle, together with the Commentaries of Averröes, found their way into Latin, probably through the medium of Hebrew. Toledo, after its capture in 1081 by Alphonso VI, became an important center of learning, and it was here that the translators pursued their task of rendering Arabic into Latin. Through their labors, by the end of the twelfth century Western Europe had inherited not only Aristotle, but a knowledge of the Arabic or Hindu notation, the *Almagest*, Euclid, and Arabian algebra. There was still much material for which Europe was not ripe, including great dictionaries and encyclopedias, innumerable biographies and histories, treatises in science and philosophy, and disquisitions on art and antiquities.

The direct bearing of Arabic culture upon European education may be illustrated by the facts that Gerbert (later Pope Sylvester II) studied in Spain; Gerard of Cremona sought a copy of the *Almagest* in Toledo; Daniel de Morlai left the University of Paris for Toledo, and brought thence to England many precious books; Michael Scott studied at Toledo, and a monk of Monte Cassino named Constantine at Baghdad; Athelard of Bath pursued Arabic science and philosophy in Asia Minor, Egypt, and Spain; while Arabic textbooks in medicine for a long time dominated the course of instruction given at the celebrated medical school at Montpellier. P. R. C.

See Semitic Education.

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ARABIC NOTATION. — See Notation.

ARABIC NUMERALS. — See Numerals.

ARBOR DAY. — See Special Days.

ARCADIA COLLEGE AND URSULINE ACADEMY, ARCADIA, MO. — An institution for the education of girls established in 1877 and under the control of the Ursuline nuns. A curriculum is provided for a course of 11 years, 8 in the primary and 3 in the academic departments. Commercial and fine arts subjects are also taught.

ARCHÆOLOGY. — Greek. — The science of Greek antiquities includes within its scope all the material remains of the Greek people. As there could be no such science until the works of the Greeks had been discovered, studied, and classified, the science of Greek archæology antedates by but little the beginning of the nineteenth century. Its development, however, has been remarkably rapid, and each year additions to the materials for study occasion constant modifications of theories and classifications.

The early history of this subject is coincident with the growth of interest in the antiquities of Rome. As early as the fifteenth century papal princes and other wealthy men in Rome, Florence, Naples, and elsewhere in Italy began to accumulate collections of ancient statues which with few exceptions were Roman copies of Greek originals. During the sixteenth and seventeenth centuries the enthusiasm for collecting antiquities rapidly developed and spread from Italy into foreign countries, being especially fostered in England by wealthy noblemen. The supply of ancient objects in Italy could not equal the demand, and therefore as early as 1630 the Earl of Arundel sought objects from Greece. But during the seventeenth century France is particularly prominent in the investigation of Greek antiquities. The French consuls at Athens studied the visible remains in the city. The French monks applied themselves to topography and prepared a map of the city, while descriptions of visits there are recorded by the French ambassador, Louis des Hayes (1630), and the French priest, Robert de Dreux (1669).

Much more important, however, was the tour of Greece made by the Marquis de Nointel in 1674, for in his party were several artists who made drawings of various ancient buildings, as well as of the sculptures in the pediments of the Parthenon. The sketches of the Parthenon are of peculiar importance, as they represent the state of the building prior to its bombardment by the Venetians in 1687. About this same time (1675–1676) another important tour of exploration of Greece was undertaken by a French physician, Jacob Spon, and George Wheler, an Englishman.

The violent conflicts between Turks and Venetians for the mastery of Greece at the end of this century occasioned the destruction of many ancient buildings that had previously been visited and described. For the next fifty years, apart from some Italian studies of minor importance inspired by the brief Venetian occupation of Athens, we have no reports on the antiquities of Greece. But in the year 1733 an event destined to have great influence on the development of public interest in Greece was the formation of the *Society of Dilettanti* in London. Members of this society furnished support to the publication of the most ambitious work on Greek remains undertaken up to this time. In 1751 two Englishmen, James Stuart, a painter, and Nicholas Revett, an architect, began in Greece a careful and accurate study of ancient buildings and sculptures which occupied them for several years and resulted in the publication of an epoch-making work in four volumes, *The Antiquities of Athens* (1762–1816). Before the second volume of this work had appeared an expedition was sent out (1764) by the Society of Dilettanti to make a similar extensive study of the antiquities of Ionia. Revett as architect again, with his associates Richard Chandler and Pars an artist, published the discoveries in two volumes (1769, 1797). About this time too appeared (1763) a great work, the *History of Ancient Art*, by a German scholar, Johann Joachim Winckelmann (1717–1768). Although Winckelmann never visited Greece and had practically no Greek originals before him in Rome, his vision was so broad and his insight so keen that his work was for many years the highest authority on Greek art, and he is justly regarded as the father of Greek archæology.

The popular interest in Greek antiquities that was fostered in England by the Society of Dilettanti, by the collections of noblemen, and by the foundation of the British Museum (1759), in Germany by the researches of Winckelmann and others, was aroused equally among the French by the victories of Napoleon, who plundered Italy and other parts of Europe of many works of art in order to form in Paris a Musée Napoléon. Under Napoleon too the royal collection in the Louvre was opened to the public as the Musée Français (1798), and Visconti, a distinguished Italian scholar, was placed in charge of antiquities in France.

Napoleon's booty, which came largely from Italy, was naturally Roman for the most part, but in England in the meanwhile a constantly increasing number of Greek antiquities was being gathered in the Museum as well as in private collections. Then in the opening years of the nineteenth century occurred a notable event in the history of our subject. Lord Elgin, the British Ambassador to Constantinople, received permission from the Ottoman government to remove some sculptures from the Acropolis in Athens, a concession which, freely interpreted, resulted after a year's work (1802–1803) in a shipment to England of many sculptures, chiefly from the Parthenon, the Erectheum, and the temple of Athena Niké. The immediate effect of their arrival in England was a quarrel as to their artistic value, which was belittled by the Society of Dilettanti under the leadership of Richard Payne Knight, so that it was not until after distinguished foreign scholars, notably Visconti and Canova, had expressed their admiration of them, that the sculptures were acquired by the English government for a comparatively small sum and placed in the British Museum (1816), where the Elgin marbles are still the chief artistic treasure of the people.

In the meantime other Englishmen were seeking and studying antiquities in Greece. Among them those who achieved most important results were the architects Cockerell and Foster, who, together with two Germans, Haller von Hallerstein and Linckh, discovered in 1811 most of the pedimental sculptures belonging to the temple of Aphaia on the island of Ægina. These were purchased at auction in 1812 by Crown Prince Ludwig of Bavaria, and were placed eventually in the Glyptothek at Munich. Another important work undertaken by members of this same party in 1811 was the investigation and excavation of the temple of Apollo at Bassæ in Arcadia, which contributed much to the knowledge of Greek architecture and resulted in the discovery of many pieces of sculpture, mainly from the frieze, which were bought for the British Museum in 1814. About this time, too, investigations were made by Cockerell and other English architects of the ruined temples of Sicily, at Girgenti and Selinunte; while in 1828 Northern Italy furnished a large amount of new material for the study of Greek art in the discovery of several thousand painted vases on the estate of Lucien Bonaparte at Vulci in Etruria. Collections of painted vases had long been in existence, the oldest catalogue of such a collection being dated as early as 1696, and perhaps the most notable was that made by Sir William Hamilton which he sold to the British Museum in 1767. As many of these vases were found in tombs in Etruria, they were generally regarded as examples of Etruscan art, although Winckelmann in his *History of Art* had declared that they were wholly Greek, a view which did not receive wide acceptance until similar examples of painted pottery had been found in various sites of Greece, and Otto Jahn in 1854 had made an accurate and comparative study of all the material available.

In the years immediately preceding and during the tumult of the Greek struggle for independence (1821–1832) no archæological study was possible in Greece, though on the Island of Melos in 1820 was found the statue of Aphrodite, which was acquired by the French Ambassador in Constantinople, who presented it to the Louvre, where it was placed on exhibition in 1821. With the successful termination of the revolution and the election of the Bavarian Prince Otto to the throne of Greece in 1832 a new era dawned for Greek archæology. A German scholar, Ludwig Ross, was appointed Conservator of Antiquities, under whose direction the Acropolis was cleared of all but ancient buildings, the temple of Athena Niké, which had been torn down for a Turkish fortification, was restored to its original position, and many fragments of sculpture and architecture were carefully collected. Ross was succeeded as Conservator of Antiquities in 1836 by a Greek, Pittakes, and the growing interest of the natives in the ancient remains of their land was evidenced by the formation of a Greek archæological society in 1827. Foreigners, however, still continued to make the most important researches. In 1846–1847 an English architect, F. C. Penrose, made careful and accurate studies of the Parthenon and Propylaia, and in this decade the German savants Ross and Ulrichs traveled through many parts of the Greek world, making notes and observations which are still of value. English expeditions to Lycia in 1842–1844 brought to the British Museum many of the sculptures of the "Harpy Tomb" and the "Nereid Monument," while later expeditions secured to England the greater part of the Mausoleum of Halicarnassus.

In 1846 was founded the French School of Archæology in Athens. This incident marked an epoch in Greek archæology because the French method, which has been imitated by other nations, has been to train young men by residence in Greece, through whom elaborate and systematic excavations could be conducted. From the discovery of the Beulé gateway of the Acropolis in 1852 up to the present time the French School has been engaged in a series of works of the first importance. They have made excavations at Myrina in Asia Minor, at Mount Potus in Bœotia, at Tegea in the Peloponnesus, and they have uncovered two great sanctuaries of Apollo at Delos and Delphi. At both of these sites work has been conducted for many years and is not yet completed. At both places blocks of buildings have been unearthed, which yielded many inscriptions, vases, and coins, much information on architecture, and some important sculptures, of which the most famous is the bronze charioteer found at Delphi in 1896 and exhibited there now in the local museum.

The Athenian branch of the German Archæological Institute was founded in 1874, but throughout the century Germans had played an important rôle in the development of archæology, and shortly before that date, Heinrich Schliemann had given a new impetus to the study, and opened a new field for research by the discovery (1871) of the mythical city of Troy, where were found treasures of gold and gems, and examples of art and craft, which, known before only by vague references in ancient authors, were supposed to be creations of poetic fancy. Further excavations in Troy were made by Schliemann in 1878 and 1890, and the work there was finished in 1893–1894 by Wilhelm Dörpfeld, who for more than twenty-five years was in charge of the Institute at Athens. Confirmation of the existence of an advanced civilization prior to the beginning of Greek history was sought and found by Schliemann at Mycenæ (1874) and at Tiryns (1884). A sketch of the other manifold activities in the province of Greek archæology in which Germans have been engaged during the past quarter of a century would require a lengthy treatise. Only their most extensive and important campaigns may be mentioned. In the years 1875–1880 the entire precinct of Olympia was excavated under the direction of Ernst Curtius by means of funds provided by the German Empire. This was the first great scientific excavation which for accuracy of work and record set a new standard for archæologists. The results were particularly important for architecture, as the Heræum, one of the oldest Doric temples, was uncovered beside the larger and later temple of Zeus; and for sculpture in the unearthing of the pedimental statues and metopes from the Zeus temple, the Niké of Pæonius, and the Hermes of Praxiteles, all now exhibited in the Museum at Olympia. Another great German undertaking was the excavation of Pergamum by the Berlin Museum (1878–1886), as a result of which the important reliefs from the famous altar of Zeus were secured to the city of Berlin. Since 1900 the German Institute has been continuing work on this site under Dörpfeld's direction, in order to lay bare the entire city. Another city dating for the most part from Hellenistic times which has been excavated by the Berlin Museum is Priene (1895–1899), under the direction of T. Wiegand, and under the same auspices Miletus (1899) and Didyma, where work is not yet entirely completed. Other important work has been carried to completion at Thera (1896–1901) by Hiller von Gaertringen, and at Ægina (1901–1904) by Adolf Furtwängler.

While Germany has been the most active and successful nation engaged in Greek archæology, the representatives of other nations have not been idle. In 1882 the American School of Classical Studies was founded in Athens, and Americans have been engaged in three large undertakings, at Assos (1881–1883), at the Argive Heræum (1892–1893), and, since 1896, at Corinth, where many landmarks of the ancient city have been located, notably the agora, the theater, and the famous fountain of Pirene. The American School also has nearly completed (1910) an elaborate and exhaustive study of the Erechtheum in Athens, which is expected soon to be published. Furthermore, Americans have just set hand to two undertakings which promise to outrank in magnitude and importance any they have hitherto attempted, namely, the excavation of Sardes, capital of Lydia, under the direction of H. C. Butler, and of Cyrene in Libya by the Archæological Institute of America. The English, who in 1879 had organized a Society for the Promotion of Hellenic Studies in London, founded a school at Athens in 1885, by which, among other works, excavations have been made at Megalopolis (1890–1891), on Melos (1896–1899), and since 1906 have been conducted successfully at Sparta. But England's greatest claim to fame in this line rests on the remarkable results attained by Arthur Evans in Crete, where since 1900 he has conducted excavations at Knosos which have proved that as early as 2000 B.C. the people of this island had developed a high degree of knowledge in art and sculpture, construction and design, comfort and sanitation, and possessed an elaborate system of writing, attested by over 6000 inscriptions, still undeciphered.

These results have been confirmed at many other places in Crete, notably at Phæstus and Agia Triada by the Italian scholars Halbherr and Pernier, at Gournia by Americans, at Palaikastro and elsewhere by the British School. Among the activities of other nations Austria should not be overlooked, for from her originated several important undertakings, an expedition to Samothrace (1875), to Giölbaschi (1882), whence were brought to Vienna the remarkable sculptured friezes, and finally the uncovering of the city of Ephesus (1895–1905). The Austrians also maintain an archæological mission at Athens as a branch of the Archæological Institute in Vienna (1898). Danish excavations have been conducted in Rhodes since 1902 by Kinch and Blinkenberg with unvarying success. Italians have limited themselves to Crete, but the founding of a school in Athens which has been recently determined by the Italian government will undoubtedly lead Italian scholars into other branches of this subject.

While the Greeks have thus generously accorded to foreigners the privilege of conducting these important and extensive undertakings in their land, they themselves have been engaged in archæological works of equal magnitude, which have been carried out by their trained scholars with scientific accuracy, and have yielded notable results. The present Ephor of Antiquities, Panagiotes Kavvadias, excavated the entire surface of the Acropolis to bed rock (1885–1891), finding among other objects many architectural fragments which proved the existence of two early temples of Athena antedating the Persian Invasion, and a series of fifteen statues of women, still retaining brilliant coloring, although buried since 480 B.C., which furnished a new chapter to the study of the development of Attic art. Another great work successfully completed by Kavvadias was the excavation of the precinct of Asklepios at Epidaurus (1881–1903), the most famous health resort and sanatorium of ancient Greece. The Greeks have also completed important and successful work at Eleusis (1882–1890), at the Amphiaraion of Oropus (1884–1887), at Lykosoura (1889), and elsewhere.

As a result of this ceaseless activity during the past quarter century Greece is known to us better than she has ever been known before. Her history has been pushed back a thousand years, so that ages before Homer's time we can trace the migration of Hellenic people, their invasions, their attacks, their defeats. Her artistic bloom in the time of Pericles we know to be a renascence of the Minoan-Mycenæan period that reached its acme a thousand years earlier, and moreover we can follow the decline of the one period and watch the growth of the second. The development of the artistic principle, according to canons, and in distinct schools, is clear to us, and the widespread publication of reproductions of Greek sculpture and architecture has had a wholesome influence upon the artists and architects of our own day. Furthermore, through the excavation of entire cities, the habits and customs of the average Greek are familiar not only to scholars, but to the average man to-day, through the scattering of ancient objects of all kinds from Italy and Greece, and their exhibition in the many museums of the world, among the most important of which must now be reckoned the Metropolitan Museum of Art in New York and the Museum of Fine Arts in Boston, which furnish to Americans a first-hand knowledge of many departments of Greek art and life.

The institutions where Greek archæology may be most satisfactorily studied are here named, together with a statement of courses occasionally offered by each: —

American. — University of California: Introduction to classical archæology; History of Greek art; Topography of Athens.

University of Chicago: Greek life studied from monuments; Ancient Athens; Olympia and Delphi; Inscriptions; Art; Sculpture; Vases; Architecture; Greek and Roman coins.

Columbia University: Introduction to Greek archæology; Sculpture; Epigraphy; Vases; Acropolis of Athens.

Cornell University: Greek archæology; Pausanias; History of Greek sculpture; Greek life.

Harvard University: Greek archæology; Topography and monuments of ancient Athens; Paleography; Epigraphy; Vase-painting.

Johns Hopkins University: Greek archæology; Topography of Greece and of Asia Minor; Vase-painting; Sculpture; Epigraphy; Paleography; Architecture; Greek life.

University of Michigan: Pausanias and the topography and monuments of ancient Athens; Ancient Athenian life; History of Greek art; Paleography; Epigraphy.

University of Pennsylvania: Greek archæology; Greek life; Epigraphy; Pausanias.

Princeton University: Topography of Attica; Greek inscriptions; Greek dialects; Greek theater.

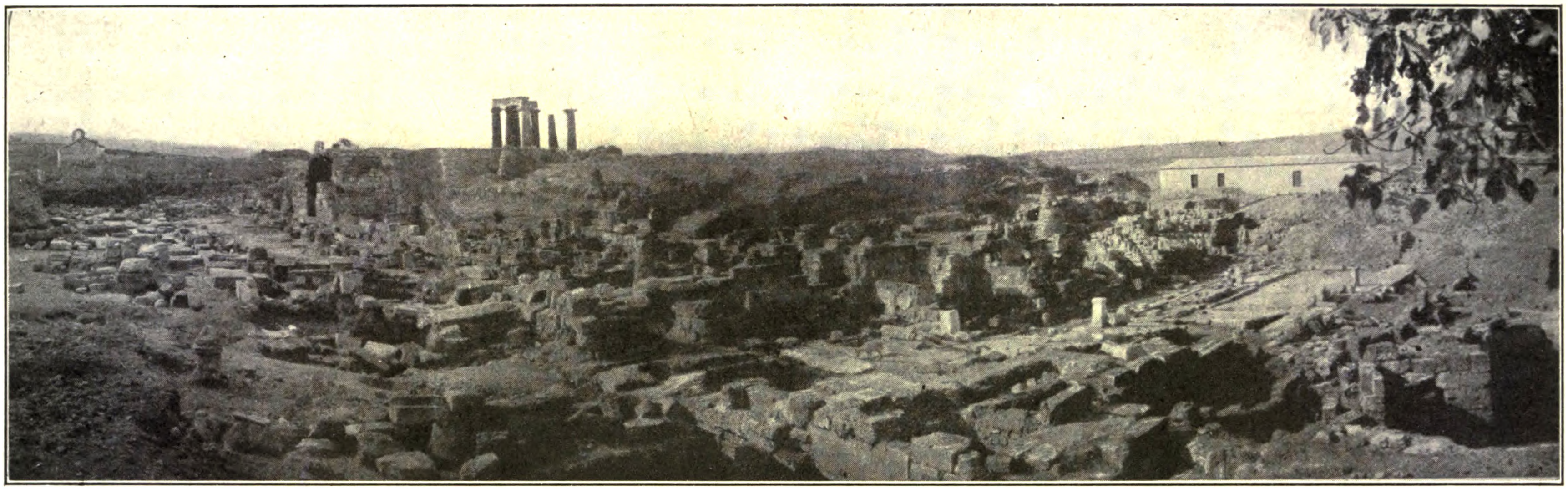
Yale University; Topography and monuments of Athens; Greek sculpture, and the lesser arts; Architecture.

Similar courses are offered at all the more important foreign universities, of which may be mentioned particularly: —

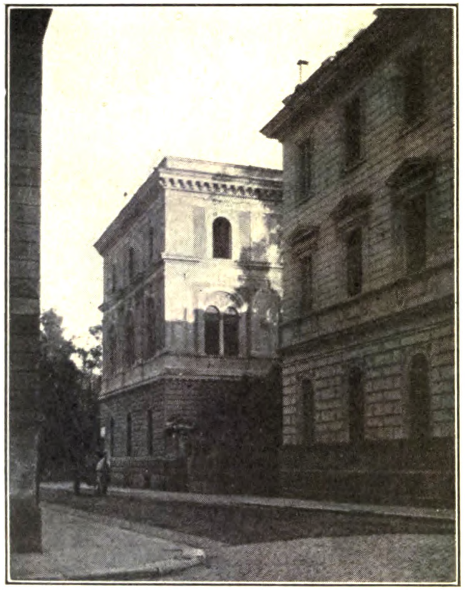
German: The Universities of Berlin, Bonn, Halle, Leipzig, and Munich.

French: the Sorbonne, and École du Louvre at Paris. T. L. S.

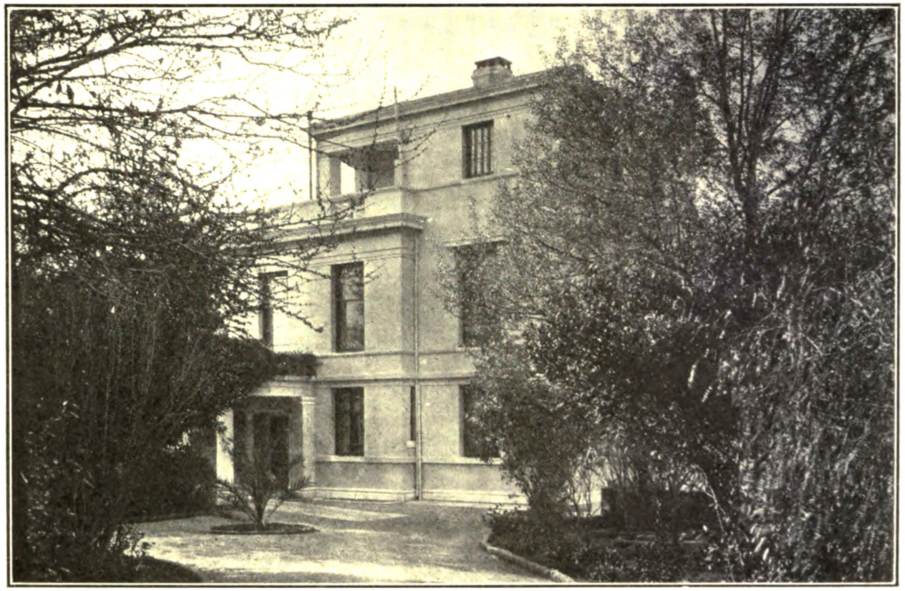
Roman. — Roman archæology may be roughly defined as the science which deals with the tangible remains of ancient Roman civilization. By the study of these remains in the light of ancient literary records the



Excavations of the American School at Corinth.



The American School at Rome.



The American School at Athens.

archæologist attempts to restore the external surroundings of the Romans of antiquity.

The history of Roman archæology may be said to begin in the Middle Ages with the guidebooks to the city which were prepared for the use of pilgrim visitors at a time when most of the ancient buildings had already disappeared. The destruction of ancient Rome had been due in some measure to early Christian fanaticism, which wished to remove all reminders of pagan religion, and in greater measure to the plundering spirit of barbarian invaders. But the greatest offenders of all were the Romans themselves, who even until Renaissance times looked upon the monuments chiefly as valuable repositories of building material. In the fourteenth century, however, the ignorance and carelessness of the Middle Ages began to give way before a growing intelligent curiosity, and Cola di Rienzo (1310–1354) sought to connect the Rome of his day with the glorious past and to find grounds for the reëstablishment of the Roman republic in his interpretation of ancient ruins and inscriptions. From this time on the sentiment in favor of preserving the monuments increased, and museums of antiquities began to be established in Italy. As early as 1467 statues were brought together from all parts of the city by Pope Paul II, the Capitoline Museum was founded by his successor Sixtus IV (1471), and the earliest of the Vatican collections (Belvidere) began to take form under Julius II in 1510 (Michaelis, in *Jahrbuch d. K. D. Arch. Inst.*, V, 1890, p. 10). Meanwhile interest in the topography of ancient Rome had been aroused by Poggio Bracciolini (1380–1449) and Flavio Biondo (*Roma Instaurata*, 1446), and in sculpture by Andrea Fulvio and others, but these and their successors in the sixteenth and seventeenth centuries had little or no sense of the development of antiquity. All periods were alike to them; the historical method had not yet been formulated. By the eighteenth century the number of marbles, bronzes, and other ancient objects accumulated in the museums had vastly increased, and a master hand was needed to bring order out of this chaos. The necessary impulse was given by the discovery of Herculaneum in 1720 and of Pompeii in 1748, and the historical and scientific method which is still pursued was definitely introduced into archæological studies by Winckelmann (1717–1768), though Count Caylus (*Recueil d'Antiquités*, 1752–1754) had already made a beginning in this direction. Winckelmann's most important works were *Geschichte der Kunst des Alterthums*, Dresden, 1764–1767 (tr. by G. H. Lodge, 2 vols., 1880) and *Monumenti Inediti*, Rome, 1767. In these he laid down and applied the principles now everywhere recognized, that the artistic product of antiquity must always be studied in the light of the history and customs of the time, and that the development of art must be traced step by step from its primitive beginnings to its highest excellence and its final decay.

During the first half of the nineteenth century the excavation of Pompeii was carried forward with the support of the Bourbon rulers of Naples, considerable digging was done in Rome, and, especially after 1827, many Etruscan tombs were discovered at Corneto, Chiusi, Cervetri, and elsewhere, and their wall paintings, bronzes, and painted vases brought to light. The great increase in archæological material now emphasized the need, already felt, of a definite organization for systematic study and publication. This led to the establishment at Rome in 1829 of the Istituto di Correspondenza Archeologica, which was at first international, but in course of time became the Imperial German Archæological Institute. Among its publications were the *Annali dell' Istituto di Corr. Arch.* (vols. 1–57, 1829–1885), from 1886 known as the *Jahrbuch des K. D. Arch. Insti uts* (Vol. XXV, 1910); and the *Bullettino dell' Istituto di Corr. Arch.* (1829–1885), from 1886 known as the *Mittheilungen des K. D. Arch. Instituts, römische Abtheilung* (Vol. XXV, 1910). Catalogues, too, of the collections of antiquities in Rome were prepared, and extensive projects of publication, for example, the *Corpus Inscriptionum Latinarum*, were undertaken. In fact, the Institute served and still serves as a kind of archæological university.[1]

In 1875 was organized l'École française de Rome to give archæological training to French students. Its chief organ is the *Mélanges d'archéologie et histoire*, published, one volume each year, since 1881, though it shares with the French school at Athens responsibility for a series of valuable monographs on archæological subjects begun in 1876 with the general title *Bibliothèque des Écoles françaises d'Athènes et de Rome.* Next the American School of Classical Studies in Rome (Via Vicenza 5) was organized in 1895 by the Archæological Institute of America for the purpose of furnishing to graduates of American colleges advanced instruction and guidance in those studies which may be best pursued in Rome. The investigations of its members have been published regularly in the *American Journal of Archæology* (second series, Vol. XIV, 1910), and two volumes of "supplementary papers" have appeared. This school, through its former professors and students now teaching in many American institutions of learning, is exerting a real and steadily increasing influence upon classical studies in America. The latest of the foreign schools to be established was the British School at Rome, opened in 1901. Under its auspices four volumes of researches, with the title *Papers of the British School at Rome*, have been published.

While all this archæological work has been done by the foreigners in Italy, the Italians themselves have not been idle. Almost all the excavation in Italy in recent years has been conducted by the Italian government, whose official organ of publication is the *Notizie degli scavi di antichità* (monthly since 1876), now in Vol. VI (1910), Series 5 of the *Atti della Reale Accademia dei Lincei.* By the authority of the same academy are published the *Rendiconti* (Vol. 19, 1910), and the *Monumenti Antichi* (Vol. 22, 1910). The municipal archæological commission of Rome, too, issues the *Bullettino della Commiss. Arch. Comun. di Roma* (Vol. 38, 1910), and the *Società Italiana di archeologia e storia dell' arte* recently established its own beautifully illustrated magazine *Ausonia* (Vol. 4, 1910). All these periodicals, together with others of less special importance for Rome, record the history of archæological progress year by year, and must be read constantly by those who desire to keep abreast of the times in this rapidly developing subject.

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[1] An excellent account of this movement is given by A. Michaelis in the *Journal of Hellenic Studies*, Vol. X, 1889, pp. 190–215.

The principal fields included under the general head of Roman archæology are architecture, sculpture, painting, and the minor arts. In all these Rome was debtor first to the art of Etruria and afterward to the Greek art of the Hellenistic period. From Etruria, her only teacher of art during the early days of the Republic, she took over the arch and the vault, the so-called Tuscan order or Etruscan-Doric column, the structure of the temple, and the type for dwellings and tombs, as well as derived a certain tendency to realism in sculpture and her whole technique in the minor arts. From Greece she took the Ionic and Corinthian orders and the general plan of such buildings as the theater, the circus, the portico, and the basilica. The fora, surrounded by great public buildings, were modeled after the Greek ἀγοραί, and under Greek influence private houses became more luxurious and more elaborately decorated, and a feeling for beauty was developed in every field of art. Until the third century B.C. and even later, the Roman had been so intent on defending his independence, extending his sway, and developing his political organization, that he had little time for the cultivation of art. But when all this was past and he had nothing more to fear, that is, when he was at last in a position to develop an art of his own, he found himself face to face with a competitor so immeasurably his superior in all things artistic that he yielded completely and once for all to the Greek influence.

And yet the Roman was not merely a slavish imitator. Though he borrowed the elements from Etruria and Greece, he impressed them with his own stamp and developed an art which, if not equal to Greek art from the point of view of ideal beauty, yet had its own strength and characteristic features quite in harmony with the genius of a conquering, organizing, and governing people. He found new ways of using the architectural elements, he developed the composite order and the honorary column with sculptures in relief, he transformed the agora, the basilica, the theater, and the circus, he invented the amphitheater and the baths, and he surpassed all the peoples of antiquity, if not of all time, in his great works of public utility, such as bridges, aqueducts, and military roads. In short, in all the arts the Roman struck out new ways for himself, adapting his artistic heritage in accordance with his own tastes and needs. The highest level of artistic excellence was reached in the first century and a half of the Empire, after which Roman art, yielding more and more to the national tendency to the colossal in construction and to the florid in decoration, rapidly declined.

The branch of art in which the Romans were most original was architecture, and the chief fundamental elements employed by their architects were the arch and the vault. It was largely through increasing freedom and boldness in the use of these elements that Roman architecture developed a national character and was able to inclose vast interior spaces unencumbered by columns. It began in simplicity, following closely the Etruscan models, then took over the Greek orders and changed them, gradually grew more elaborate and profuse in rich ornamentation, especially with colored marble, and finally degenerated into mere bigness and ponderosity. The available materials were at first only the soft volcanic tufa of the neighborhood, later supplemented by peperino from the Alban region, and travertine from the valley of the Anio near Tibur, but by the end of the Republic the use of baked bricks, concrete and imported marble, the standard building materials of the Empire, had commenced. A combination of lime and the red volcanic earth known as *pozzolana* produced an hydraulic cement which, mixed with fragments of stone, of brick, or, in later times, of marble, formed a concrete of unequaled hardness and durability. Most walls of imperial times were constructed of this concrete with a facing of bricks or small stones of regular shape with points tailing inward, this again being furnished with a covering of stucco or of richly colored marble slabs (H. W. Pullen, *Handbook of Ancient Roman Marbles*, London, 1894). Solid arches also and vaultings were made of this concrete — a fact which more than anything else accounts for the characteristics and development of Roman architecture.

In this method of construction the column had no structural function and was frequently engaged as a mere decorative element on the surface of walls or pillars of concrete, though there were many exceptions, especially in temples or porticoes, in which columns were used independently to sustain the entablature and the roof. Of the Greek orders the Doric and Ionic met with comparatively little favor at Rome, as they were too simple and severe to appeal strongly to Roman taste in any but the early period. When the Doric does appear, it is not in the pure Greek form, but in the so-called Tuscan form which had been adopted from the Etruscans. In this type of column a base was placed under, the fluting was omitted, and various ornamental elements were added at the top. During the Empire this order was usually limited to exterior use and in the lowest story of buildings like the Colosseum and the Theater of Marcellus, in which a series of columns of the Ionic order form part of the exterior ornament of the second story. Far more popular with the Romans was the more elaborate and ornate Corinthian order, which they used with a very rich entablature. By a combination of the Corinthian with the Ionic capital a new order was developed, the most elaborate and most characteristically Roman of all. This so-called Composite capital was frequently enriched in fantastic ways, and sometimes even human figures were introduced, as, for example, a figure of Hercules in a capital at the Baths of Caracalla.

The entry of the Italian troops into Rome, and the establishment of the national capital there in 1870 mark an important era in archæological studies. The excavations made in connection with the building of new streets and new houses laid bare many previously unknown ancient structures and brought to light so many statues and other artistic products of antiquity that the museums could not contain them. And in addition to these accidental discoveries great advances were made in the systematic campaign of excavation carried on by the new government. On the Palatine Hill the Villa Farnese had passed, in 1861, into the hands of Napoleon III, who had caused extensive excavations to be made for the purpose of laying bare the remains of the imperial palaces. In the course of this work (1869) the lower levels of the so-called House of Livia had been cleared and the three rooms with fine wall paintings brought to light. These explorations were now continued and extended over almost the whole surface of the hill until a fairly clear idea of the appearance of this aristocratic region of imperial Rome was obtained. The original palace of Augustus, which was enlarged and rebuilt in more sumptuous fashion by Domitian, is still to a large extent concealed under the buildings and grounds of the Villa Mills, but the government is now in possession of this also, and will probably excavate it at an early date. The year 1907 witnessed the excavation of the lower levels at the west corner of the hill, which has always been associated with the foundation of Rome. Here fortification walls and a reservoir for water of very early times were discovered, and also a cemetery with primitive burials, which, taken in connection with similar prehistoric cemeteries found in recent years in the Forum and on the Quirinal, seem to show that more than one settlement must have occupied the region of the "seven hills" as early as the ninth or tenth century B.C. The full significance of these latest discoveries, however, is not yet apparent.

In the Roman Forum long-continued excavations have changed the picturesque Campo Vaccino of a hundred years ago into a dreary waste — relieved here and there by recently planted trees and flowers — full of ruins and architectural fragments. For this loss of natural beauty, however, there is ample compensation in our increased knowledge of Roman topography and antiquities and in the light that has been shed on Roman history, particularly of the earlier periods. In the first half of the last century, especially under the direction of Carlo Fea, and, after 1827, of Antonio Nibby, considerable portions of the northwestern end of the Forum were uncovered and the slope of the Capitoline Hill with the foundation of the Tabularium was laid bare. After 1870 the work, which had been neglected for seventeen years, was again taken up by the new government, and has been vigorously pushed forward — with interruptions — till the present time, particularly under the supervision of Rosa, Fiorelli, Lanciani, and Boni. The whole area of the Forum was now freed from earth and rubbish, the temples of Vesta and Divus Iulius were excavated, the Sacra Via was opened up from the temple of Faustina to the Basilica of Constantine, and the House of the Vestals was discovered. Still more important are the results of the latest campaign, which began in 1898. The excavated area is now fully twice as great as it was ten years ago, and exploration has been pushed to deeper levels than ever before, but without destroying the monuments of later times which often rest upon those of the earlier periods. The most striking discoveries made in the course of this work were the so-called Lapis Niger with the shrine and very ancient inscribed stele beneath, the spring and shrine of Juturna, the early Christian Basilica of S. Maria Antiqua, the primitive cemetery, the base of the equestrian statue of Domitian, the Lacus Curtius, and the Tribunal Prætorium. In 1908 workmen were engaged in clearing the Basilica Æmilia and in digging near the Arch of Titus in the effort to locate the site of the temple of Juppiter Stator. Other excavations in and near the Forum, especially in the Comitium, will, it is hoped, proceed as rapidly as possible and still further valuable results be reached.

Mention should be made in passing of the splendid house of the Augustan period which came to light in the garden of the Farnesina across the Tiber during the building of the new river embankment in 1878. Its well-preserved wall paintings belong to the so-called second style, and for beauty, richness, and at the same time good taste are as far superior to most of the Pompeian paintings as the capital of the empire was superior to the little country town of Campania. The ceilings of stucco, too, ornamented with graceful patterns in relief, so different from the more elaborate and gaudy work of later times, furnish some of the most beautiful specimens of ancient decorative art, and are among the most valued treasures of the National Museum.

Apart from these and other results of excavation in Rome, the rapid archæological progress of the last thirty years has been due in large part to a more thorough study of monuments that have long been familiar in connection with those more recently brought to light. From these researches has come forth a better appreciation of Roman plastic art, which is no longer considered merely as a subordinate and unimportant development of Greek sculpture, but as a phase of art in many ways independent and quite worthy of study by itself and for its own sake. About 1880 F. von Duhn showed that a number of monumental reliefs in the Villa Medici, the Louvre, and elsewhere were parts of the Ara Pacis Augustae decreed by the Senate in 13 B.C. in honor of Augustus and in commemoration of the world-wide peace. Later Eugen Petersen continued the study of this subject and after further excavation and discovery on the site of the altar itself was able to give a fairly complete idea of its size and shape and of the arrangement and significance of its historical and decorative reliefs (1894). This magnificent monument is purely Roman in conception and execution, and is now justly regarded as the finest example of Roman plastic art in the early days of the Empire. Next followed a series of brilliant researches in the later periods. Franz Wickhoff studied the reliefs of the Arch of Titus (1895) and gave a more definite idea of the technical methods and conceptions of the Flavian artists. Konrad Cichorius published in beautiful plates with explanatory text (1896–1900) the historical reliefs of the column of Trajan. About the same time (1895) casts and photographs of the reliefs on the column of M. Aurelius (Piazza Colonna) were made at the expense of the German Emperor, and thus it was possible for the first time to study these two honorary columns in connection. From this comparison the spiral band of relief representing scenes from the expeditions of M. Aurelius against the Germans, though of great interest, especially for the ethnologist, was more distinctly recognized as vastly inferior in artistic value to the apparently similar band on the earlier column. The Arch of Constantine, too, near the Colosseum, came in for its share of attention, and Petersen enabled us to distinguish clearly between the fine round medallions stolen by Constantine from some monument of Trajan and the oblong sculptured panels of the time of M. Aurelius; even the unpractised eye can discern by a single glance at the reliefs that belong to the period of Constantine the almost incredible decadence of art in the fourth century. This arch thus holds a unique position among the monuments of Roman art in that it presents at the same time examples of the artistic workmanship of three distinct periods.

The ruins of Pompeii and the objects found there — now preserved mainly in the Naples Museum — constitute one of the chief sources for our knowledge of ancient Roman life and in particular of the Roman house, its furniture and decoration. After 1860, when Bourbon misrule came to an end, the Italians put the excavations in charge of Giuseppe Fiorelli, who carried the work forward with great energy and careful scientific method. Now for the first time the upper stories of buildings were carefully preserved and a much more complete idea of the structure of the house was possible. At the same time, through the broad-minded policy of Fiorelli, opportunity to study these materials was freely given to all, an opportunity of which archæologists were not slow to avail themselves. The extant paintings of Pompeii and Herculaneum were catalogued by W. Helbig, who argued in a series of brilliant investigations that the paintings, though executed in Roman times, were merely inferior copies or adaptations of Hellenistic masterpieces. This view was subsequently much modified by the studies of Otto Donner and others, who showed that these wall decorations, while in many cases derived from the Greek, are yet in some respects quite independent and have characteristics which are purely Roman. In 1873 Fiorelli published the results of his long-continued study of the materials and methods employed in the building of Pompeii, a subject which has been treated also by R. Schoene, H. Nissen, and since 1879 by A. Mau (died April, 1909).

The earliest period of Pompeian architecture — leaving out of consideration the Doric temple and the city walls — is the so-called "period of the limestone atriums," in which the houses were built mainly of the limestone taken from the bed of the neighboring river Sarno. They were without columns, without paintings, and of one story in height. The best remaining example of this type is the House of the Surgeon. This period was followed about 200 B.C. or a little later by the "tufa period" which roughly coincides with the second century B.C. The use of columns now led to an extension of the earlier Italic plan of the house, and a peristyle and other Greek elements, together with a second story, began to be added. At the same time the interior walls were colored, but not adorned with paintings. Residences of palatial size and grandeur, like the House of the Faun, were now constructed, and fine public buildings, such as the large theater, baths, and temples, arose. All this points to the strong influence of Greek art and Greek culture during this period, which came to an end with the conversion of the city into a Roman colony by Sulla. From this time forward bricks were used along with tufa and lava, as the favorite building material, and the interior walls of houses are now no longer colored only, but are decorated with real paintings.

The earlier students of Pompeian archæology had given only superficial attention to the wall paintings, and it remained for Mau to show that the "Pompeian style" was in reality a series of several different styles quite distinct from one another. As has been indicated above, it was with the strong Hellenistic influences of the "tufa" period that Greek fondness for color made itself felt at Pompeii, but only in so far as to cause the introduction of the "first style" of decoration, in which the wall covered with stucco was made to imitate by color and relief a surface veneered with slabs of colored marble. The most fitting floor to accompany these walls was mosaic pavement, such, for example, as the mosaic picture of Alexander in battle, discovered in 1831 in the House of the Faun. In the period of the Roman colony a new method of wall decoration came into vogue, the "second" or Architectural style, which still imitated the veneering of marble, though without the aid of relief, but added various architectural designs. This style "remained in vogue to the time of Augustus, and then gave place to the 'third' or Ornate style, which is characterized by a freer use of ornament and the introduction of designs and scenes suggestive of an Egyptian origin." It is therefore natural to associate this style with the period which followed the conquest of Egypt and its conversion into a Roman province (30 B.C.). "The 'fourth' or Intricate style came in about the year 50 A.D. and represents with its involved and fantastic designs the last stage in the development of Pompeian wall decoration" (Mau-Kelsey, pp. 43 ff.). Mau, as the quotations show, held that these four stages followed one another in turn, and as far as the first and second styles are concerned this is perfectly clear. But it cannot be considered established that the third and fourth were not contemporaneous. The final victory of the fourth over the third style in the reign of Nero was quite in harmony with the tendencies of the time. It is, of course, perfectly obvious that this development of wall decoration was not confined to the comparatively unimportant Campanian town. Rome has yielded some examples, and specimens have come to light elsewhere, but the study of origins and influences in the history of ancient wall decoration is as yet only well begun. The materials are becoming abundant, — the House of the Vettii, discovered in 1894–1895, alone has scores of pictures, — and steady progress toward fuller knowledge seems assured.

Similar rapid advances have been made in our knowledge of the minor arts of antiquity. To give even a superficial account of the vast materials in this field which are now treasured in the museums would require a volume; for the present purpose an illustration or two must suffice. In 1894–1896, through excavations which were made at Boscoreale near Pompeii, we had our first glimpse into the arrangements of an ancient country residence. The most important "find" was an elaborate set of silver dishes and utensils — 103 pieces — which the owner had been unable to carry away with him at the time of the disaster which overwhelmed Pompeii and its vicinity, though he had already gathered it together for that purpose. Notwithstanding the efforts of the Italian government to prevent its export, this priceless treasure of ancient toreutic art soon found its way to Paris, where it is now preserved in the Louvre. The two cups with the skeletons in high relief grouped with philosophers and poets probably came from Alexandria; the bowl with the high relief in the bottom representing Alexandria as a goddess, if not itself executed in Egypt, is surely a copy of an Alexandrine work. On the other hand, those pieces which portray historical scenes from the lives of Augustus and Tiberius, and those which are adorned with Roman portrait heads, are of course Roman in origin. Most of the pieces are doubtless of Roman execution and probably of the Augustan age, though the influence of Alexandrine, and in general of Hellenistic, models must not be forgotten. Another silver table service, little, if at all, inferior to that of Boscoreale, was found in 1868 at Hildesheim and is now in Berlin. These two collections, together with some others of less importance, and the individual objects unearthed in various places, give a fairly complete idea of the work of the Roman silversmiths.

For the study of ancient pottery, as well as of workmanship in gold, bronze, iron, ivory, glass, and precious stones, extensive materials are now available. Readers who desire to pursue the subject further will find the necessary direction in the selected bibliography given below.

As a subject of study in the college and in the university, Roman archæology has never claimed and does not yet receive as much attention as Greek archæology and art. There are signs, however, of improvement in this regard, and most of the better American and Canadian institutions, following the example of German universities especially, now offer instruction in one or more branches of the subject. The courses most commonly given are those in Roman Private Life, but in some of the leading universities, more particularly those which have graduate schools of high rank, instruction is usually offered in general Roman Archæology, Roman Art and Architecture, topography and monuments of Rome, and in a few places, for example, Chicago, Columbia, and Johns Hopkins, in numismatics. Sometimes, as at Yale, a man who is primarily interested in the Greek field gives courses on the Roman side also, more often the Roman archæology is divided among the Latinists and the Greek archæologists, as it is, for example, at

Chicago, Harvard, and Princeton, but in most places this work falls to the busy professor of Latin. Few institutions, possibly only Columbia and Johns Hopkins, have men of professorial rank whose time is devoted exclusively or almost exclusively to this department. Of late years some of the leading universities have been accumulating archæological materials for teaching purposes, and museums of greater or less extent devoted to Roman antiquities and inscriptions are coming to be regarded as indispensable for work of a high order in this field. The most notable of such collections for the use of students are probably those of Columbia, Johns Hopkins, Michigan, and Pennsylvania. H. L. W.

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ARCHÆOLOGICAL INSTITUTE OF AMERICA. — Founded in Boston in 1879 and incorporated by Act of Congress in 1906; it has its headquarters in Washington, D.C. Its purpose is to promote archæological research by founding schools and maintaining fellowships, by conducting excavations and explorations and aiding in those conducted by others, by publishing the results of archæological research, by holding meetings for the presentation and discussion of archæological subjects, and by maintaining courses of public lectures.

The work of the Institute is organized in the following departments, each of which is in charge of its own managing committee: Greek, Roman, Oriental, American, Renaissance. To these Egyptian is now being added. The American School of Classical Studies at Athens, established in 1881, has conducted excavations at the Argive Heræum and in Corinth as well as at several less important sites in Greece, and has published several volumes of Papers, Bulletins, and Reports. The American School of Classical Studies in Rome was founded in 1895, and though not permitted to excavate, has published two volumes of "Supplementary Papers" and many special monographs. The American School of Oriental Study and Research (Jerusalem) was organized in 1900, and has already done important work of exploration in Palestine. In 1907 the School of American Archæology (Santa Fé) was founded as a school of research to direct investigations in the American field. Its activities have extended to Arizona, Utah, New Mexico, Mexico, and Central America. The work in Medieval and Renaissance studies is pursued chiefly under the direction of the School in Rome, where a large library is deposited for that purpose.

In addition to the researches and publications of the schools, the Institute itself has carried through large undertakings of publication and excavation. For example, it conducted extensive excavations at Assos, and is now (1910) beginning work at Cyrene. Besides its special publications, it regularly issues the *American Journal of Archæology* and the *Bulletin of the Archæological Institute of America.*

The Institute consists of 32 affiliated Societies, with a total membership of about 3000, situated in the chief cities of the United States and Canada. To each of these are sent annually several lecturers, both American and foreign, to present the newer phases of progress in the different fields of archæological research. Fuller information with regard to the Institute may be had from the Secretary, George Washington University, Washington, D.C.

See Archæology.

ARCHDEACON. — It has been assumed or suggested by a good many writers on the history of educational institutions that the archdeacon was the primary educational authority. But there is nothing in the canon law to suggest that teaching or inspection or government of schools and scholars formed any part of the archidiaconal functions. In the Institution of St. Osmund, *c.* 1090, the archdeacon's duties are summed up in the terms, "the archdeacons' powers lie in the cure of souls" (*archidiaconi in cura pollent animarum*). They exercised, by devolution from the bishop, whose eyes they are said to be (that is, inspectors on his behalf), and to whom they reported, jurisdiction over offenses against morality and sins of a character absolution for which was not reserved to the bishop or the Pope himself. In the case of an ordinary bishopric or cathedral, the educational authority was not the archdeacon, but the schoolmaster, later called chancellor. In some cathedrals, however, the archdeacon was the principal person next after the bishop, and it so happened that this was the case with Bologna (*q.v.*), the seat as some say of the first, and at all events of one of the first and most famous of universities and the specially legal university. In this position he seemed to have exercised the same kind of power in regard to the university as the Chancellor of Notre Dame did at Paris. But it is noticeable that in perhaps the earliest mention of him in this capacity he is called archdeacon and chancellor, viz. of the cathedral, and in 1464 is called head and chancellor of the university, and the position was formally conferred by Papal bull of Honorius III, an ex-archdeacon of Bologne himself. This case, though it is in fact no proof of archidiaconal authority in education, but rather the contrary, may have given rise to claims of the same sort by other archdeacons. In England the archdeacon seems to have been unknown before the Norman Conquest. Archdeacons only appear in three or four charters, all of them marked as spurious. As the system of schools was fully established, this seems to be conclusive against their possessing in England educational power *ex officio.* The schoolmaster and chancellor used this in the secular cathedrals, while the bishops (see BISHOP'S SCHOOLS) in the case of the monastic cathedrals retained this educational power of supervising schools and appointing masters in their own hands. The presence, however, of the Archdeacon of Oxford, when some statutes were made for the grammar schools there in 1306, has been inferred to show archidiaconal control over them. But he was accompanied by the official (later called chancellor) of the Bishop of Lincoln, and seems to have been acting jointly with the official as the bishop's representative. At Cambridge, 30 years earlier, the Archdeacon of Ely seems to have contested with the Chancellor of the University the jurisdiction over the grammar schools there, which were no doubt older than the university, and not part of it, and the master of which exercised independent jurisdiction over his scholars as his brother of Canterbury did. The appointment of this master of 'glomery' or grammar seems indeed to have belonged to the archdeacon, and the reason no doubt was that it had been assigned to him by the bishop, Ely being a monastic see, and his cathedral therefore not possessing a chancellor. At Worcester it would appear that the archdeacon claimed a similar authority, and in 1312, when the bishop appointed a master of the grammar school of the city of Worcester, he said that he did so whether the power of appointment belonged to him by episcopal or by archidiaconal authority, thus overriding whatever claim the archdeacon may have made. At Canterbury from 1306 to 1450 the archbishop himself appointed the master, and so at Winchester as late as 1455. The engraving given in Emil Reiche's German *Lehrer* in 1901, purporting to be an archdeacon teaching boys reading and music, must be a case of mistaken identity. The person in question has on a doctor's cap. There is no evidence forthcoming of an archdeacon acting as teacher.

After the Reformation, when chancellors of cathedrals ceased to exercise any educational supervision, and the officials had become merely judges of the bishop's courts, the archdeacons were employed as the bishops' representatives to make inquiries as to schools for the enforcement of the canon and statute law imposing tests on schoolmasters. It was a regular part of their duty at visitations to inquire whether the schools were kept by persons properly licensed and who had taken the necessary oaths, and whether they were suspected of papacy or nonconformity. This was particularly the case in the reign of Elizabeth, and we find instances wherever the records of visitations can be found. So, when the Barons of the Exchequer wanted to be satisfied in 1572 that the schools continued by the Chantry commissioners were in working order and deserved the stipends paid out of the Exchequer, the inquiry was directed to the bishop, who deputed the archdeacon to visit the place and see, and he reported to the bishop, who made return to the Exchequer court. After the Toleration Act, when the ordinary ceased to have power, the archdeacons ceased to make inquiries about schools, and all connection with them ceased. A. F. L.

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ARCHES, SCHOOL OF THE. — A school in London of early origin, attached to the Church of St. Mary Le Bow, which stood upon arches and was known as the Ecclesia Sanctae Mariae de Arcubus (bow was the usual Saxon term for an arch or bridge, see Hutton, A. W., *A Short History and Description of Bow Church*). The school was possibly held in the ancient crypt, which still exists, though the church itself was destroyed in the great fire of 1666. There is knowledge of the school in the eleventh century. The School of the Arches, and the schools of St. Paul's and St. Martin's Le Grand were the only three schools in London which had the exclusive right to educate as against strange unqualified masters who attempted to open schools in the fourteenth century. It is interesting to notice that the secular courts supported the strange masters against the ecclesiastical authorities who protected the three schools. This action of the secular courts was reflected in the decision in the Gloucester Grammar School case (1410). In 1446 the number of recognized schools rose to five, but the claim was again questioned in the following year, owing to the great need of grammar schools in London.

From this date the history of the School of the Arches is obscure. It is probable that the grammar school, like many others in the seventeenth century, was converted into an elementary parochial school and was taken over in 1701 by the Charity School Movement (*q.v.*). The school became a ward school for boys and girls in 1714; was removed to Old Change in 1766, to Distaff Lane in 1818, and in 1855 out of London to Anglesea House, Shooter's Hill, above Woolwich. To this day the children from this school are taken annually on St. Mark's day to a church in the immediate vicinity of St. Mary Le Bow, to the Church of

St. Mary Aldermary, to hear a sermon on "the excellency of the Liturgy of the Church of England." It is tempting to believe that this church is attended by mistake, and that the children are intended to go to the church that is almost entirely built on the site of a Roman temple, to the church where the Court of Arches sat for seven or more centuries, to the church where the curfew bell about the year of Grace 1375 called Dick Whittington back to London. J. E. G. DE M.

See articles on TEACHERS, LICENSING OF; MIDDLE AGES, EDUCATION IN.

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ARCHIMEDES. — The greatest mathematician of Greece, and a prolific and profound writer on mathematics and physics. He was born probably about 287 B.C., and was killed at the sack of Syracuse by the Romans in 212 B.C. He visited and probably studied at Alexandria. In elementary mathematics he is known chiefly for his mensuration of the circle by a method still in use in the schools, and for his treatise on the sphere and cylinder. Among the propositions enunciated by him is the one asserting that the area of the surface of a sphere is four times that of one of its great circles, and the one comparing the volume and the surface of a sphere with those of the circumscribed cylinder. The style of Archimedes was not like that of Euclid (*q.v.*). The latter was essentially a teacher, and a genius in textbook-making; but Archimedes was a discoverer, and his writings were less suited to the use of the beginner. D. E. S.

See ALEXANDRIA, SCHOOL AND UNIVERSITY OF.

ARCHITECTURAL EDUCATION.—Historical. — Systematic provision for the technical training of architects for their profession is a comparatively modern institution. The oldest existing school of architecture is that of the French Academy at Rome established by Louis XIV, in 1671. But this was not a school with a complete curriculum of professional study, and it was not until 1816, under Louis XVIII, that the first completely organized training school for architects was established — that of the *École des Beaux-Arts* at Paris. Previous to that date preparation for the practice of architecture was obtained, as for most other callings, by apprenticeship to practitioners already in the exercise of their profession. This was true not only of Europe in the Middle Ages and in the Renaissance, but probably also of Egypt, Greece, and Rome in antiquity. We have no records to enlighten us in detail as to the manner in which the architects of the classic ages received their special education, as we certainly should have had if there had been specially organized professional schools of architecture. It is, however, known that the building crafts were in the hands of guilds which, under the later emperors at least, were hereditary; and it is probable that in each guild there were schools or other means provided for teaching the craft, besides the apprenticeship of sons to fathers or to other masters. It is also a well-known historical fact that the Emperor Constantine did, in the fourth century, establish such a school at Rome for the training of the architects to be employed in building his new capital at Byzantium on the Bosphorus, the existing supply of capable practitioners being unequal to the extraordinary task of transforming a second-rate provincial town into a completely equipped imperial capital. But this was an exceptional provision for an exceptional emergency, and passed away with the emergency which had called it into existence.

It is not known how or where men like Anthemius and Isodorus, the architects of Hagia Sophia, two hundred years later, were educated for their stupendous task, or their successors, who continued for nearly a thousand years to maintain in Southeastern Europe the traditions of the Byzantine style. But as it was predominantly an ecclesiastical style, it was probably, to some extent at least, the Greek and Byzantine monasteries that supplied the technical and artistic part of that education.

With the end of the tenth century there began in Western Europe a revival of architecture, which took on an extraordinary development during the latter part of the eleventh and during the twelfth century. This revival, which was itself but one phase of a marvelous and widespread intellectual awakening, was chiefly monastic and ecclesiastical in character, and it was in the great monasteries, especially those of the Benedictine and Cistercian orders, that the men were trained who built the great abbeys, cloisters, and churches of the Romanesque style. This, at least is true of England, France, and Germany. It is probable that there was a much larger secular element in the development of architecture in Italy at the same time, though just how important was the part played by the *maestri comacini*, or guilds of masons, at that time is not certainly known. (Cf. Leader Scott, *The Cathedral Builders.*) But so far as Western Europe is concerned, it was in the great monasteries that the master builders of the Romanesque period learned their crafts. These monasteries were the chief homes and nurseries both of learning and of the fine arts in those days, and come nearest to offering a parallel to the architectural schools of our own time. But it must not be imagined that there was anything like the organized curriculum and discipline of the modern schools. The various departments of architectural training had not been reduced to precise canons and scientific formulation. The methods were those of apprenticeship; constructive and engineering principles, so far as they had been formulated at all, had been worked out empirically, as the results of hard experience; architecture was not a profession, but a craft, embodying traditions that had been gradually accumulated in the building experience of the monasteries, to be mastered by practice, not erudition. The work of design and building was not divided in the lines of modern practice, and the training required was totally unlike that needed by the modern architect. The design, certainly the type, of each building, was based on that of some other building of the same class already erected, with such improvements as the experience of that building suggested. Neither in general design nor in details was there necessity for completely new invention. The number of kinds of buildings required was comparatively small; the requirements changed little and slowly. The monastic apprenticeship sufficed for the occasion.

With the decline of the paramountcy of the monastic orders, the practice of architecture passed chiefly into the hands of the guilds of the masons and other building trades, and its problems were multiplied by the addition of civic structures — town halls, courts of justice, and palaces. The master masons were trained by apprenticeship in their guilds, very much as they had formerly learned their trade in the monasteries. There was no real change in the system of training until the Renaissance revolutionized the art and practice of architecture, and introduced wholly new elements into design which the guilds were ill fitted to supply. In the first place, the revival of classic studies and the effort to restore the classic, that is Roman, forms and ideals in architecture, made necessary an intimate knowledge of Roman details and gave rise to the archæological study of antique monuments. In the second place, the development of secular and palace architecture, of landscape gardening and architecture, and the adoption of the dome in place of the Gothic groined vaulting as the distinctive feature of church architecture, revolutionized construction, and made almost useless the entire traditional apparatus of the mediæval architectural teaching. Architecture became more than formerly an art of pure design, less one of structural exigency. Its successful practice required the training of the taste and of the sense of proportion and decoration, skill in drawing, and a thorough mastery of the classic alphabet of architectural elements, rather than the apprenticeship of the mason's shop and stoneyard. Design and execution became separate and independent activities, and except where the building of a great dome in masonry called for special experience in scientific construction, there were seldom structural difficulties of a kind to call for any special scientific training on the part of the designer. Hence during the earlier Renaissance goldsmiths, painters, sculptors, and inlayers successfully attempted architectural design, while in the later Renaissance of the seventeenth and eighteenth centuries architecture was successfully practiced by learned amateurs and members of other professions. The east façade of the Louvre and Christ Church in Philadelphia were designed by physicians (Dr. Perrault and Dr. Kearsley respectively), while the greatest of all English architects, Sir Christopher Wren, was a professor of astronomy at Oxford when he began his career as an architect.

Modern Architectural Instruction. — The present section of architecture of the *École des Beaux-Arts* (see ART SCHOOLS AND ART INSTRUCTION IN EUROPE) was definitely constituted in 1816 in the reign of Louis XVIII. This school has supplied a pattern for all other French schools of architecture, and for the American schools to a considerable degree, and has strongly influenced even the German and Austrian systems. It was in this school that the principles and the various categories of architectural knowledge were first analyzed and separated into distinct groups or courses of instruction, and the ancient methods of apprenticeship training in the *ateliers* or offices of leading practitioners — which had previously offered the only available means of acquiring the art — were modified and adapted to the purposes and systematic organization of a great school. The theory, mathematics, and science of architectural design and construction were, and still are, taught by lectures to large classes at once. The drawing and the design proper were, and are, taught in various studios or *ateliers* maintained by different masters, subject to competitive tests from time to time in both drawing and design. In Great Britain preparation for the profession is still in large measure acquired by apprenticeship; the student pays an annual premium to enter the office of a practitioner as an articled pupil, and receives such instruction as the master may choose to give him, working meanwhile as a draftsman on his master's business, when not receiving instruction. Elsewhere in Europe architectural education is chiefly in the hands of the government, in connection either with technological schools or schools of art. Thus in Switzerland the chief school of architecture is that of the Zurich Polytechnicum; in Vienna it is in connection with the Imperial School of Art; in Germany there are departments of architecture in various *Technische Hochschulen*, while in Turkey a school of architecture is maintained by the Imperial Museum of Art at Constantinople. The Italian architects are trained chiefly in schools of engineering.

This variety in modern methods of technical education in architecture is due to the manifold aspects and relations of architecture. It is at once a science, an art, and a learned profession; its practitioner must furthermore be familiar with a number of mechanical trades; and the knowledge and experience it calls for are of the most varied character. One system of training may emphasize its scientific side, dwelling upon the mathematics, mechanics, and engineering necessary for the proper designing of foundations, retaining walls, roofs, vaults, columns, and girders, or upon the physics, chemistry, and electrical science required for the proper construction, wiring, and heating and ventilating equipment of a modern building; and these are subjects best taught in a school of engineering. Another system may emphasize the artistic side of architecture, giving special importance to the teaching of drawing, drafting, shades, and shadows, perspective and modeling; to the history of architectural styles and ornament, and to the theory and practice of design. Such a school would naturally be joined to a school of art rather than to a technological institute.

Present Position. — These observations lead naturally to a survey of the work of the architect and of the various branches of study that may be considered as preparatory for this work.

The function of the architect is the designing of artistic buildings; that is, of edifices which, while they serve the utilitarian purpose of housing and sheltering human beings, activities, industries, and material goods in the most convenient and efficient manner, shall also be in themselves beautiful, objects of pleasing contemplation, adornments to the city or region in which they are placed. This combination of utility and beauty, this joint and simultaneous pursuit of the useful and the beautiful, is what differentiates architecture from engineering. Fundamental to all artistic design is drawing, as essential to the designer as writing is to the novelist or poet. Fundamental to correct construction in its higher forms is mathematics with its applications in mechanics. Mathematics and drawing are thus the foundation studies of all training in architectural design. But these two heads cover a large number of distinct subjects. Freehand drawing may include drawing from the flat, from casts, from objects, from living models, draped or nude, in pencil, water colors, charcoal and crayon, pen-and-ink. Architectural drawing or drafting comprises projections, intersections, shades and shadows, perspective, descriptive geometry, and stereotomy; the drawing of the orders of architecture and of the elementary forms of architecture — doors, windows, arches, arcades, vaults, balustrades, spires, etc.; the combined application of projections and shades and shadows to the "rendering" of plans, elevations, and sections with shadows cast and interpreted in washes of India ink and color; and practice in the making of office drawings with their conventional representations and systems of tinting and figuring.

The scientific study of construction has been greatly complicated in modern times by the marvelous development of steel as a building material, and lately also of concrete, and by the growing complexity of modern buildings. Plumbing and wiring, heating and ventilation, elevators and mail chutes, have introduced numberless features and problems unknown fifty years ago. The architect must provide intelligently for these in his designs, besides knowing how to calculate the strength of columns and girders, arches and vaults. Hence in addition to the prerequisite algebra, geometry, and trigonometry, he should master analytical geometry, the calculus and mechanics, graphical statics and strength of materials. A fair knowledge of physics and chemistry and of their applications in sanitation, heating and ventilation, and electric installation, is important. Indeed, these studies may be carried very far into their various subdivisions and applications without exhausting the list of desirable scientific attainments of the architect.

While pursuing these various studies, the student is presumably applying his newly acquired knowledge in the solving of problems in design. In this work he will be aided by lectures on the theory of design and decoration, and by familiarizing himself with the history and characteristics of the various styles and of the great masterpieces of his art. Lectures and seminars on the history of architecture and of ornament, with study of reference books and photographs, will provide the means for acquiring this sort of knowledge and resource. The problems in design are worked out in the studio or drafting room, under frequent criticism and advice, and in most schools are judged by a jury of award. In England especially, and also in some other European schools, the measuring of actual examples of historic architecture and the embodying of the results in carefully elaborated scale drawings, is a valuable adjunct to the work in design. The methods and procedures in the teaching of design vary greatly in different countries and in different schools; some emphasize planning, some draftsmanship; in some schools the teaching is extremely practical, in others very idealistic. Some make sound construction and practical convenience the chief considerations; others seek to stimulate the imagination and cultivate the power of artistic expression; while in still others archæological correctness, erudition, and detailed acquaintance with and use of particular historic styles are insisted on as *sine quâ non* in good design.

But while there is this wide variety of method, proportion, and emphasis, there is a fairly general agreement as to the essential subjects of study. They may be grouped under the five heads of (*a*) Delineation, including all graphics and drawing; (*b*) Construction, divided into science, comprising all the mathematics and engineering of the course, and practice, comprising specifications, materials, and superintendence; (*c*) History, treating both of architectural styles and of their decorative details, with whatever may be necessary in the way of archæology; (*d*) Design, comprising theory (theory of planning, of composition, of decoration, of color, etc.), and practice (the solution of problems in design upon definite programs); and finally (*e*) Office Practice: the principles of contracts, professional relations, ethics, competitions, etc. Other studies are often found in the programs of architectural schools, such as history, economics, modern languages, or English literature, but these are simply introduced as elements of liberal culture; they are not parts of an architectural curriculum. Certain other studies, not strictly architectural, are nevertheless desirable as preliminaries or additions to an architectural curriculum; notably such sciences as botany, hygiene, physics and chemistry, analytical geometry and the calculus.

There is a wide diversity of opinion and practice as to the best methods for the teaching of design, especially as to the relative importance of imaginative and practical problems. The French system, which is also the basis of the systems of most American schools, eliminates as far as possible from the problems given out to be solved by the students those practical and utilitarian elements which in real practice so often hamper the freedom of the designer. The programs of these problems require no figured working drawings and structural details, no calculation of strains and stresses, no minutiæ of flues and ducts, no consideration of cost. They are intended to stimulate rather than to restrict the imagination, and to give the widest possible scope for artistic expression. They are usually of a more or less monumental character, in order to train the student into a due sense of the possibilities of large conceptions, dignified composition, and harmonious detail. Particular emphasis is laid upon the plan, upon the right balance and distribution of parts, the proper handling of entrances, circulation, stairs, and vistas, and an artistic and logical correlation of exterior and interior, of plan and section and elevation. The theory is that an architect so trained will, under the restrictions of practical work, still conceive his designs in a monumental spirit and upon artistic lines; while one who has never had this sort of training will always dwell on details and utilitarian considerations, and his work will always lack imagination and the higher artistic qualities. In some quarters, both in France and elsewhere, this idea is decried, and the student is required from the first to work out problems of the character which he is likely to meet with in ordinary practice, and as nearly as possible under the limitations of ordinary practice. There is also considerable variety as to the treatment of style, some schools insisting on classic or neo-classic details, some on the archæologically correct use of historic nonclassic styles. The relative importance of artistic draftsmanship varies greatly in different schools. Most of the American schools follow the lead of the École des Beaux-Arts in attaching great importance to the drawing and " rendering " of the designs; but there is in many minds an appreciation of the danger of over-valuation of mere draftsmanship as against design properly speaking.

In all schools the student is required to do a certain amount of what might be called office work; that is, to prepare working drawings with structural details of one or more of the designs he has made; but here again there is wide variety in the amount and character of such work. In the French system it is confined to a single problem, the final task in the curriculum for the diploma; a thesis problem of a practical though monumental character which forms the culmination of the course in scientific construction. Most of the English schools are evening schools for draftsmen employed in offices during the day; and while the office work thus gives the student a certain amount of practical experience, a large amount of time is also generally devoted to the study in the school of practical construction in a very detailed manner, often with classroom demonstration of the various building trades by expert workmen in those trades.

All this variety of theory and practice in architectural education is due to the great complexity of architecture, which has so many branches, and is related to so many interests and so many kinds of knowledge that it is impossible to include them all in any scheme of teaching that comprises only three or four years' work. Every system of architectural training is therefore of necessity a compromise, and its real function can only be to equip the student with a fund of knowledge upon which he can safely base all his later acquisitions; and with a method of work and a habit of thought which will enable him in his after practice to acquire further knowledge and skill and use these wisely and well. It is therefore less the particular things he studies and does in the schools than the way in which he is taught to study and do them, that counts. That school does the most for him which trains him best for the needs of five and ten years after graduation, rather than for mere draftsman's work in the years immediately succeeding his school days.

England. — In England the theory is that office work and academic training should be coincident and complementary. The student enters the office of an architect as an " articled " student or apprentice for a term usually of three years, paying an annual premium for that period and receiving such instruction as his chief may give him. As soon as he is able, he passes the preliminary examinations held by the Royal Institute of British Architects. His further studies may be continued during his articled service by attendance on evening classes maintained by various colleges, boards, and societies (*e.g.* the evening classes of the Architectural Association or of the South Kensington School of Art); and in time, usually at the end of four years, he may go up for the final examinations of the Institute; and again, after a still further course in the Royal Academy classes, he may compete for a gold medal or a traveling bursary or studentship.

This system is being considerably modified, however, by the multiplication of all-day courses (*e.g.* the Edinburgh College of Art, the London University College School, the Architectural Association day classes) for students who can afford to dispense for the time being with office work, having already had two or three years of it, or intending to take it up after the school course is finished. But in few or none of the schools does pure design, exemplified in a long series of progressive problems upon ideal programs, receive the emphasis and attention which characterize the French and American systems, nor is academic draftsmanship taught after the Continental and American fashion. On the other hand, more is made of pen drawing and measured drawings of existing monuments than anywhere else.

France. — In France the young student enters the École des Beaux-Arts or one of the provincial schools on passing entrance examinations in the orders, drawing, mathematics, history, and modeling, and is enrolled in one of the *ateliers* or studios of a professor in the school or of an outside practitioner, for the work in design in the " second class." Upon passing examinations in the school in descriptive geometry, stereotomy, analytical geometry, and construction, and acquiring a certain number of " values " in freehand drawing, modeling, and design, he is admitted to the " first class." In this grade he pursues further studies in construction, building legislation, and other technical branches and after acquiring further " values " in drawing and design, he prepares an elaborate thesis design with the structural details and engineering calculations fully worked out, and graduates with the *diplôme du gouvernement*, which qualifies him for official appointment in any of the numerous governmental services of communes, municipalities, or departments (counties), or of the general government. Usually a certain amount of office experience has been acquired by sporadic engagements during the scholastic course.

The distinctive excellence of the French schooling lies in its system of teaching design and in the admirable training which it provides in all forms of artistic draftsmanship. Architecture is conceived of throughout as an art, and all constructive science as subordinate to and serving the art of design. Hence the work in design predominates throughout. In Paris the programs of all the problems for the two classes respectively are issued by the Professor of Theory upon specified dates: the students make summary sketches of the proposed solutions of these problems, to which their subsequent elaborations of the design must essentially conform. Two months are allowed for this elaboration, which is worked out under frequent criticism from the patron or architect-master of the *atelier*. But quite as valuable, in its way, as the patron's instruction is the free and constant interchange of criticism and assistance between the students of the *atelier*, the *anciens* or " elders " criticizing and instructing the younger men, who in turn assist in the drafting of the designs of the elders. The " rendered " or elaborated drawings are handed in on a fixed date, publicly exhibited, judged by a jury composed of school professors and of *patrons* of a selected list of *ateliers*, and " mentions," " first mentions," and " medals " are awarded to such among them as seem to deserve it, each award conferring a certain number of "values." Similar judgment is passed upon the work in freehand drawing in stated competitions. In addition to the regular problem competitions, there are special competitions for medals and money prizes, in decoration and architecture, such as the Godebœuf, the Chaudesaigues, and the *Prix Américain*, founded by American gifts, most of these prizes being open only to French citizens. Finally there is the annual contest for the Prize of Rome or *Grand Prix d'Architecture*. The preliminary competition, open to all Frenchmen, consists of a two days' sketch problem, as a result of which the ten final competitors are chosen, who work, during four months, upon a new program for a large and elaborate building or group of buildings. The winner of the First Grand Prize is sent to Rome as a *pensionnaire* of the Villa Medici, where he spends three years, followed by two years of travel and study in Italy and Greece at the expense of the government. This is the highest honor any student can win. It secures him important official employment and confers lasting distinction upon the winner. It is the goal of the entire system, and its influence is all-important in maintaining the classic traditions of monumental design in France.

The *École Spéciale d'Architecture*, on the Boulevard Montparnasse, Paris, is a private institution, following in part the system of the École des Beaux-Arts, but with more attention to practical details and less emphasis on academic traditions. Many architects are trained in the *École Centrale des Arts et Manufactures*, which is really a school of engineering, with incidental architectural studies. But the great majority of the successful French practitioners have been trained in the École des Beaux-Arts.

United States. — In the United States the first organized school of architecture was that established in the Massachusetts Institute of Technology, under the direction of Professor William R. Ware of Boston, in 1866. This was followed by the organization of a course in architecture at Cornell University under Professor Charles Babcock a few years later, and soon afterwards by the opening of a similar course in the Illinois State Industrial University at Champaign by Professor N. Clifford Ricker. In 1881 Professor Ware was called to Columbia College (now Columbia University) to establish a department of architecture in the technical school, then known as the School of Mines; and not long after a similar department was started in the University of Pennsylvania. Within the past 20 years, Harvard University, Syracuse University, the University of California, Washington University at St. Louis, George Washington University at Washington, D.C., McGill University at Montreal, Canada, Michigan University, Tulane University at New Orleans, and several important technical schools have established more or less complete courses in architecture. The Society of Beaux-Arts Architects of America has also established an important system of competitions in design in two classes, "B" and "A," after the model of the French École competitions, but it does not maintain any school, properly speaking.

In the majority of American schools of architecture a modification of the French system prevails. The student passes examinations for admission, approximately equivalent to those for admission to the B.A. or college course, and pursues for four years a curriculum which combines lecture courses and recitations in the mathematics, science, theory, and history of the art, with drafting-room work on problems in design and in freehand drawing. The classroom courses cover mathematics through the calculus, mechanics, graphical statics, and strength of materials; shades and shadows, perspective, descriptive geometry and stereotomy; the history of architecture; the theory of design and decoration; specifications, building construction and contracts, and in many cases, physics, chemistry, botany and geology, hygiene and sanitation, French, and German. The work in design is generally patterned after the French in the form of the program and the kind of presentation and draftsmanship required; and in several cases the professor of design is a Frenchman. But in only one school, that of Columbia University, is there more than one *atelier*. In this school there are three, each with its own supervisor or supervisors, providing the stimulus of friendly emulation within the school which the single *atelier* system lacks, and which is so important an element in the success of the Paris system. At Harvard University monotony and narrowness of teaching are avoided by intrusting the preparation of programs and the criticism of the designs successively to different architects. Several of the schools adopt the Beaux-Arts Society's problems, which thus provide an interscholastic emulation in place of the Parisian and Columbian system of inter-atelier emulation within the school.

Nearly all the schools require a graduating thesis design of some importance. Some schools require summer vacation work. Columbia requires every student to do at least one month's office work and one design in each summer vacation.

Several of the schools offer for competition among their graduates prize scholarships for foreign travel and study. Not only the winners of these, but many others, graduates or students who have spent two or three years in an American school without graduating, devote from two to four or even five or six years to study in Paris at the École, often with a view to winning the *diplôme du gouvernement*. This seems to be a wasteful course: after four years in the American school, two years in Paris — not necessarily as a registered student in the École — should suffice for acquiring the best part of the French training, — the French criticism, environment, and manner of attack and study of problems in design, — and a year or two of travel in Italy and other European centers of art, to study the great monuments of architecture, should supply the further culture and information most needed by the American practitioner.

Office training and experience in the preparation of working drawings and in the innumerable details of construction and superintendence are usually acquired by the American student after leaving the school. Only a small part of this training can be advantageously provided in a school, and this is fairly well given in the larger schools in the United States and Canada. In some cases the student enters the school after a year or two of office experience, and many schools admit office draftsmen as special or nonmatriculated students. Most of the schools confer on their graduates the degree of Bachelor of Science; two or three that of Bachelor of Architecture. Columbia University gives the degree of Bachelor of Architecture only to students who enter with two complete years of collegiate or scientific school study to their credit; a Professional Certificate is given to graduates who have entered with only a secondary school training.

The tendency in the United States is toward a constantly higher and more exacting training for the architect, and the profession is coming more and more into the hands of highly educated practitioners. Probably the weakest feature of the American schools is in their following French academic models too closely in design and draftsmanship; but there is little doubt that time will bring greater independence and a healthy originality more in accord with the American spirit of initiative than is now apparent. A. D. F. H.

See ARCHÆOLOGY; ART SCHOOLS; ARTS IN EDUCATION; DESIGN; DRAWING; etc.

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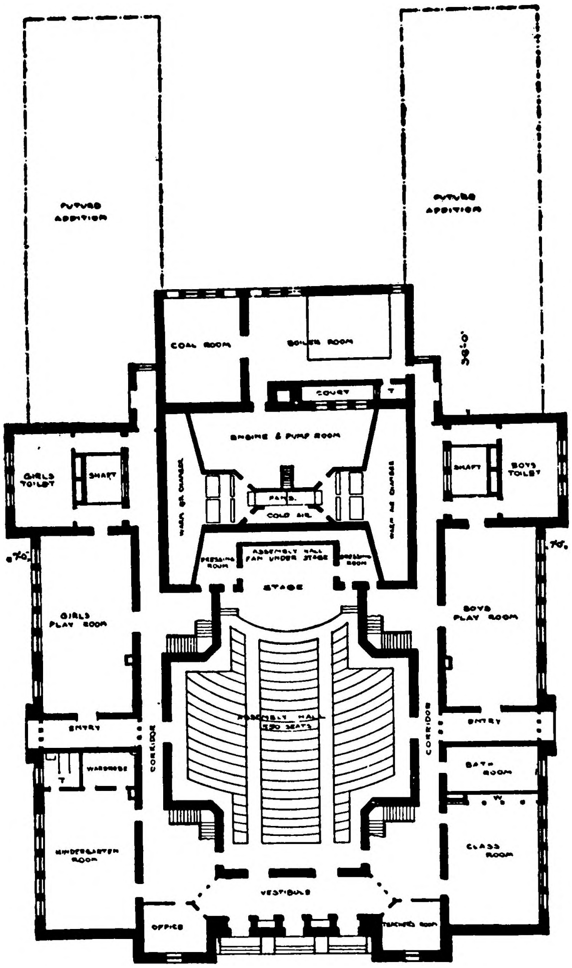
ARCHITECTURE, SCHOOL.—School architecture of to-day is the product of educational development and of educational faith. Naturally, then, if there are educational remnants clinging to our theories, we may expect to find architectural remnants to correspond. The school, as we now know it, had its beginnings in ecclesiasticism, and carries theoretical remnants which can be understood only by reference to its beginnings. Schoolhouses grew out of church buildings, and are yet often burdened with remnants which can be interpreted and made clear only by reference to their origin. All the old churches, and most of the new ones, have spires or great towers. Nearly all schoolhouses of any size built 25 or more years ago in this country likewise bear this architectural feature. Schoolhouses of the modern era were first built in churchyards or near to them, and a small part of the meager room given to the church was doled out to the school. While the schoolhouse as a public building is no longer attached to the church, the size of the lot still tells the story of this part of its heritage. In the churches and early schools, the priest-teacher spoke *ex cathedra;* the fixed platforms in grammar schools are remnants of these. Churches were for the most part cold and dark, and gloomy within; the early schools were their counterparts in these respects, and many of a like kind are yet in evidence. Churches were built on the theory that the congregation had little to do but to attend regularly, listen attentively, and keep still. Hence the windows were not primarily designed to give adequate light for either reading or writing; school buildings inherited not only the shape of their windows, but the position and relative size of them. The benches, where any were supplied in the early churches, were made to suit adults; the schools are just now getting rid of such. The old churches had no adequate means of ventilation or heating; the struggle to meet these necessities in our schools still continues. And so in many other ways the earmarks of church architecture are still clinging to our school buildings, despite the fact that many of these features are not only useless now, but never were needed in schools. But the last quarter of a century has seen great progress in school architecture, mainly as a result of a corresponding development in educational theory and practice. Modern school buildings are, inside and out, rapidly taking a form which history does not duplicate. As has been suggested, it is yet a difficult problem in many parts of our country to get rid of the useless traditions, especially the towers, but they are, generally speaking, rapidly disappearing.

In the following discussions and suggestions concerning school buildings the purpose is to consider somewhat briefly the requirements of school buildings for convenience, health, safety and general educational fitness, from the point of view of the practical schoolman rather than of the professional architect.

Building Materials. — At present the beginning of a movement for the use of more permanent materials in school buildings is increasingly apparent. Earthquakes and disastrous fires have made it clear that in the long run permanent fireproof buildings are far cheaper than those built of wood, or of brick, stone, or wood combined. With a well-defined movement throughout the country in favor of the issuance and sale of long-time bonds, to bear the cost of construction, a community has a questionable right to use such money to build school buildings of a perishable material and expect a future generation to join in payment for them. Of course there are many sides to this question; but the one here pointed out is not always in the mind of those who use the money of a future generation. This, however, is not the most important question at issue in the use of materials for the construction of public buildings. The United States government builds all its public buildings for permanency, and safety from fires and natural disasters of every sort, and as a result spends nothing for insurance, next to nothing for repairing damages caused by the elements, and a very small per cent for repairs. All the government buildings came out of the San Francisco earthquake and fire with very little damage, while wreckage and disaster appeared on every side. Make good foundations, the best possible, use good materials, the best obtainable, permit none but the best of workmen to build, employ safe forms of construction, insist that the work be done exactly according to specifications, and there is little danger. These were the lessons learned in San Francisco, but they cost many lives and hundreds of millions of dollars.


FUTURE ADDITION
FUTURE ADDITION
36'0"
COAL ROOM
BOILER ROOM
COURT
ENGINE & PUMP ROOM
GIRLS TOILET
SHAFT
SHAFT
BOYS TOILET
WARM AIR CHAMBER
FANS
COLD AIR
WARM AIR CHAMBER
DRESSING ROOM
ASSEMBLY HALL FAN UNDER STAGE
DRESSING ROOM
7'0"
7'0"
STAGE
GIRLS PLAY ROOM
BOYS PLAY ROOM
ASSEMBLY HALL 1250 SEATS
ENTRY
CORRIDOR
CORRIDOR
ENTRY
WARDROBE
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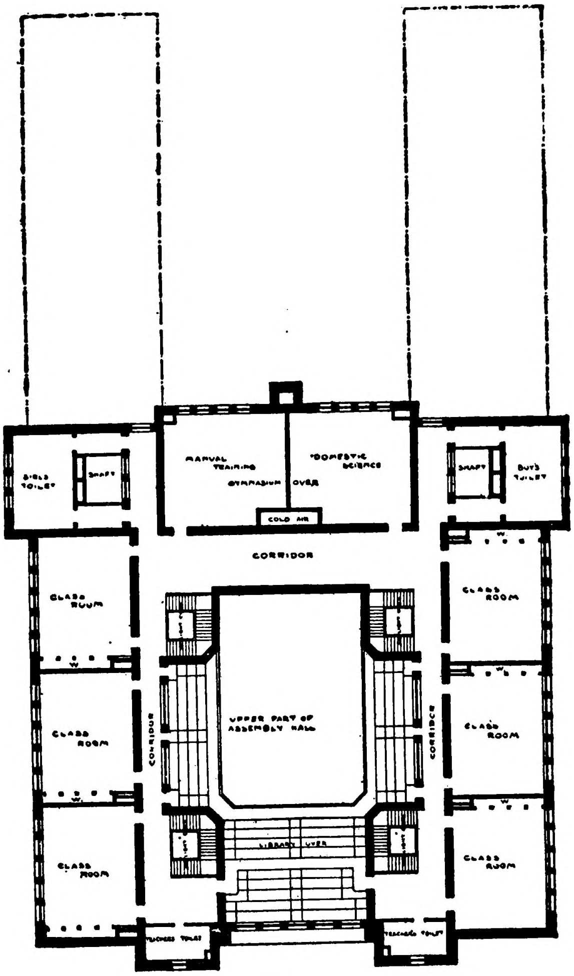
KINDERGARTEN ROOM
CLASS ROOM
VESTIBULE
OFFICE
TEACHERS ROOM

First Floor — Tilton School, Chicago.


GIRLS TOILET
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MANUAL TRAINING
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UPPER PART OF ASSEMBLY HALL
CORRIDOR
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LIBRARY OVER
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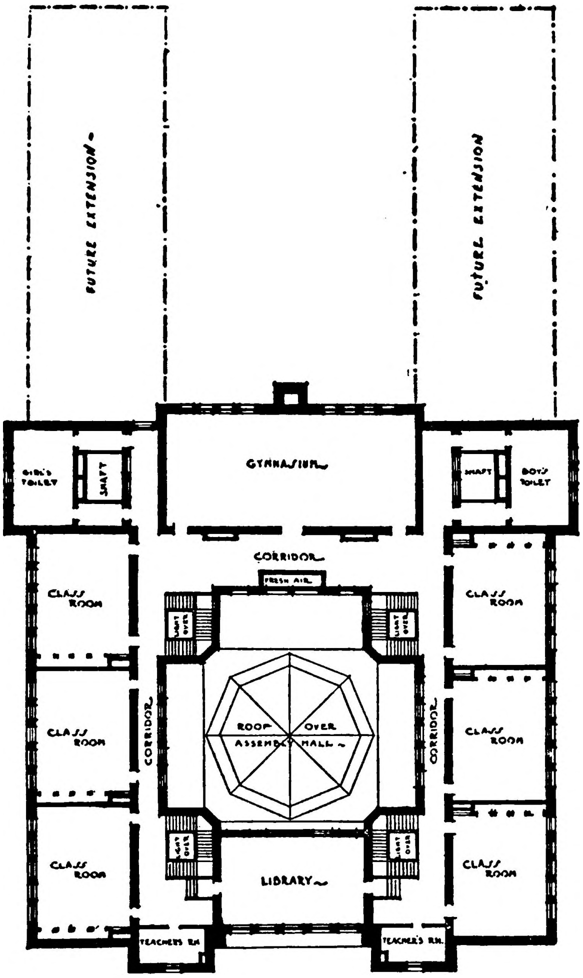
CLASS ROOM
TEACHERS TOILET
TEACHERS TOILET

Second Floor — Tilton School, Chicago.

Well-built wooden schoolhouses on good foundations, those which reach down to bed rock, or undisturbed solid clay, will stand earthquake shocks, but are always in danger of being destroyed by fire. They are expensive to keep in good condition and not infrequently are allowed to look untidy for lack of paint, or needed repairs. They are hot in summer and cold in winter, even under the best methods of construction. A very large percentage of them are in time consumed by fire, and this percentage is probably as high now as at any other time, for laboratories and electric wiring have added fuel to the flame. It seems probable that that period in the hurried and rapid development when there was neither time nor money to build more permanent buildings has nearly passed away. There has been a sudden burst into the age of cement and steel construction, and this gives promise of safer and saner use of public money for school buildings. A few years' more experience in working with cement and steel framing will make it possible to insist on fireproof construction for all large or even medium-sized school buildings. There can be no doubt that even now where the burden of a mortgage is placed on future citizens to help to pay for the construction and equipment of school buildings, this is the only just and safe thing to do. Brick buildings set on damp-proofed concrete foundations are durable if the bricks are well made and the mortar of high grade. But brick buildings when unsupported by steel frames are readily broken in earthquakes, become very damp in rainy weather or in a moist climate, and are sufficiently porous to allow strong winds to drive air through the walls. It is possible, of course, to treat brick walls with waterproofing materials so as to largely eliminate the effects of driving rains and strong currents of winds; but the general lack of knowledge in the use of such materials and the expense thus incurred operate to prevent much from being done in this direction. When the best bricks are used, put together by high-grade workmen, with cement mortar, and waterproofing material is applied, brick buildings cost nearly as much as reinforced concrete. Stone buildings are generally more expensive than those using any other kind of material because of the difficulty of getting durable stone and the expense of preparing and of handling such



Third Floor, Tilton School, Chicago.

material. It seems then that the most promising material for use in school buildings is reënforced concrete. Such buildings are readily made safe from fires, storms, and earthquakes, are warm in winter, cool in summer, and when carefully constructed are free from moisture and the troubles caused by cold winds. They will last indefinitely and become stronger with age. They will soon save their cost in reduced insurance, fuel bills, and the expense incident to repairs. It seems entirely probable in view of such methods as Mr. Robert Aiken (see "Monolithic Concrete Wall Buildings — Methods, Construction, and Cost," *Proceedings of the National Association of Cement Users*, 1909, pp. 83 ff.), Edison, and others are using, that it will not be long until reënforced concrete buildings will cost less than first-class wooden construction, and that brick and stone will be used much less extensively than at present. In those communities where workmen have learned to handle concrete, even under present conditions, it seems that a thoroughly well-built wooden building or a brick building made of first-class materials throughout and built by skilled workmen is nearly or quite as expensive as one well built of reënforced concrete. (Cf. Knapp, "The Construction and Cost of Small Concrete Houses," *Proc. Nat. Ass'n Cement Users*, 1909, pp. 204 ff.) The growing simplicity in the outward form of modern school buildings suggests a type which would readily lend itself to the use of the latter material. One present difficulty seems to be that the artist-architect does not yet know how to handle concrete to the best advantage. This is not strange, or to be wondered at in the least. Time will give greater assurance. Finally it must be remembered that wood is increasingly expensive, cement less and less expensive as its manufacture is better understood.

Types of School Buildings. — From a non-technical architectural point of view, several new types of schoolhouses are in process of development in this country, while at the same time in isolated places older forms are still retained. From a recent critical study of hundreds of school buildings both old and new from all parts of the country, the following suggestions relative to present conditions seem worthy of record: —

1. The old form of schoolhouse bearing an incongruous and impertinent tower is rapidly disappearing, though some new and expensive buildings retain this remnant of ecclesiasticism. These remnants have clung tenaciously, and in many places are very hard to get rid of. Some few modern architects have used small towers on school buildings with good taste, but others are not only wasting the public money by the continuance of such features, but shocking all sense of propriety and at the same time introducing danger without compensation. For towers are dangerous in storms, and in ninety-nine cases out of a hundred are worse than useless at all times.

2. In the old form of school buildings windows were invariably found on three sides of a schoolroom, if it were possible to so place them. This too is passing, and unilateral lighting even in a one-room building will soon be required even by legal enactments. Unilateral lighting has introduced some architectural difficulties which have been hard to overcome, but these are now being mastered, and as a result a new type of construction has developed to meet hygienic requirements in this regard.

3. Until within a very few years one of the most difficult and expensive parts of a large school building was the roof with its heavy timbers and its irregularities of proportion. A new type with a flat roof is making rapid headway, and in the main shows better lines than its predecessor. It is interesting to note that this feature has been adopted from business houses, and to those who can read between the lines it will suggest a significant change in the educational faith of the present.

4. The so-called mission style of architecture is well adapted to small or medium-sized school buildings of one, or even two stories in height,

and in the far West and southwest is showing a decided influence on the form of the newer school buildings. This type of building requires ample space for courts and cloisters, or covered passageways along the court, and is most effective in one-story buildings constructed of cement covered by a comparatively flat roof of red tiles with broad eaves. Buildings of this type blend well with the browns and greens alternately dominant in these sections of our country, and from the strictly architectural point of view, this type gives promise of a welcome relief from the almost featureless form of usual schoolhouse construction.

5. The "H" or "E" type of buildings is especially adaptable to city conditions where large buildings must be erected on small lots and in the neighborhood of tall business blocks, dusty and noisy streets. These forms give opportunities for better use of the light available, shield the classrooms to a degree from noise and dust, and furnish some court space available for open-air exercise. New York City has used these types to good effect, and other large cities have not been slow in taking advantage of the suggestions afforded. These types are especially helpful where a lot must be used which faces broad side to the north and south. These forms are also well adapted, where space permits, to enlargements without destroying the unity of the building.

6. There is a distinct tendency observable to construct buildings for manual training high schools on the factory plan, as may be observed in the great Albert G. Lane Technical School in Chicago. This is a short-sighted policy, and if continued will react against such schools to make them mere trade schools. Naturally, buildings designed especially for the manual arts must have a construction which will be suitable to their purpose, but there is more need, rather than less, to make such buildings outwardly and inwardly attractive. It is to be hoped that everywhere buildings designed for such work will in the future be built by architects who believe in the dignity of labor and in the great value of good taste for all classes of American citizens.

Foundations. — In the construction of foundations for school buildings there are certain specific requirements which deserve special attention: —

1. Foundations ought to be so constructed as to prevent moisture from rising to the upper walls on account of the force of capillary attraction. A school building is insanitary when the walls are damp, for the reason that by the evaporation of this moisture, the walls are left cold, and the air in the room is contaminated by such moisture.

2. Dry walls are necessary to prevent black boards from sweating and the walls from discoloring.

3. If wooden joists are used, they will quickly rot when in contact with damp walls, and thus endanger the safety of the building. In those sections of the country where irrigation is general and the ground water line is thereby brought near the surface of the ground, or when school buildings are located on water-soaked ground, porous foundation walls have proved especially dangerous or unhygienic.

4. All foundation walls should therefore be rendered damp-proof on the outside below the ground line, and also in cross section a short distance above the ground or immediately below the water table. There have been a number of methods devised for breaking this capillarity, but perhaps the best now known consists in incorporating in the wall just below the water table a layer of Portland cement and a good quality of sand in the proportion of 1:1 or 1½. This layer need not be more than two or three inches thick to get results. Naturally a layer so thick would be impracticable or inadvisable in a brick wall, and this may be overcome by several thinner layers of mortar. In cement walls this difficulty will not arise. A layer of slate carefully set in rich cement mortar renders a wall impermeable to rising water, but there is some danger of crushing this material in heavy walls. However, it has been used with good effect and with no apparent resulting weakness.

Naturally, the whole secret of waterproofing consists in completely filling the voids in the materials used. Hence thorough mixing before applying and a good shaking or troweling together when applying will aid. The Sylvester Process is made by using "one part cement to 2½ parts of sand and adding thereto ¾ of a pound of pulverized alum (dry) to each cubic foot of sand, all of which was mixed dry, then the proper amount of water — in which has been dissolved about ¾ of a pound of soft soap to the gallon of water — was added, and the mixing thoroughly completed." (See Taylor and Thompson, *Concrete, Plain and Reinforced*, p. 421.)

The Committee appointed by the National Association of Cement Users report that, "No difficulty is experienced in a carefully conducted laboratory in obtaining waterproof mortars in such lean proportions as one part of cement to four of sand. There is no excuse for failure when a fairly graded natural sand is used with leaner mortars, confirming the fact that the necessity of waterproofing treatment with ordinary field concrete mixtures is due either to the use of poor materials, or to poor proportioning or bad handling, or to all of these combined." (See Report of Com. on Water Proofing Materials, *An. Report Proc. Am. Soc. for Testing Materials*, 1909, p. 292.)

5. It is scarcely necessary to add that foundations should rest on solid rock or firm clay well below the basement floor. But earthquakes seem to be increasingly common these latter days, and they are likely to occur at any time and in all parts of the country. Good founda-

tions are absolutely essential to insure safety in those parts of the country where these disturbances are most common, for while a building may stand, chimneys are easily broken, and when crashing through a building are likely to cause serious damage, not to mention the possible loss of life, if the school should be in session.

6. It is therefore advisable in buildings using any kind of material for the superstructure to use concrete for the basement walls, to set these firmly, and render them proof against the rise of ground water from the sides or the ground below the walls.

Basements. — All modern schoolhouses properly placed and hygienically constructed should have basements. The necessity of basement room for school buildings has developed to meet the demands of modern methods of heating, ventilation, and general sanitation, though there are now many other uses which this part of the school building subserves. The basement of a school building deserves a great deal of careful planning in order to render it both hygienic and serviceable. In the first place, the depth of the excavation will depend on the nature of the soil, topographical features of the neighborhood, the requirements for ample light, and the size and height of the building. When it becomes necessary to locate a school building on ground as low or lower than that in its immediate environment, it is evident, unless an ample and complete system of under-drainage can be readily constructed, that a basement floor must be very little, if at all, below the surface of the ground. When a more fortunate location can be had where the natural drainage is away from the building, it is perfectly safe to drop a basement floor 3 or 4 feet below the surface of the ground, if meanwhile the form of construction will permit of ample window surface, complete drainage, and safe sewer connections. The basement room should be at least 10 feet high in the clear to properly accommodate the heating and ventilating plant and also to insure ample light, room, and ventilation. It is often almost imperative in small buildings of two or more stories in height to drop the basement floor into the ground as low as permissible in order to get good proportion; but in large buildings this is not necessary, and frequently inadvisable for the sake of proportion. Hence, it is evident that each basement must be planned not only to suit the location selected, but also to meet the requirements of proportion in the superstructure. Under some conditions much relief from what would otherwise result in unsatisfactory proportion can be obtained by judicious use of terracing.

In the next place, a basement whose floor line is 3 or 4 feet below the level of the ground ought to have as few solid inner cross walls as safety of construction and due privacy or isolation of the various conveniences will permit. Many times piers and beams or arches may take the place of solid supporting cross walls, thereby giving opportunity for better lighting, better ventilation, and better general sanitation. A basement chopped up into dark and almost inaccessible rooms is likely to be not only insanitary, but very unhandy and inconvenient. It is essential that basements receive abundance of light and from any and every quarter possible, and they need as much direct sunshine as can be admitted. The question of the location and size of basement windows is a matter of great importance both for the sake of strength and sanitation. The usual danger comes from making the windows too small, and thus by reason of the interference of thick walls only a limited amount of direct sunshine can enter. The floors of basements should be impervious to ground air, and as free from moisture as possible. It has been found that if a thick strong base of cement carefully leveled and thoroughly set is coated with a good layer of hard asphaltum evenly applied, it will furnish good protection against the rise of ground air. The difficulties with the use of asphaltum are that it absorbs much of the light, and is influenced by fire or heat about the furnaces. When a basement is thoroughly and safely guarded from the ground water by satisfactory underdrainage, much ground air that would press for entrance through a basement floor would escape through such drains and the porous soil all about the drains, and hence under these conditions a solid well-finished cement floor is entirely satisfactory. This, however, only on condition that the floors above are very tight, and special ventilating stacks lead from the basement to the outer air above the building.

The walls of a basement should be lined with white enameled brick or white glazed earthen tiles. These give a clean surface, absorb no light, are easily kept clean, and are altogether acceptable. In small to medium-sized school buildings the basement offers on the whole the best location for latrines and urinals. There are some objections to locating these necessities in a basement, but when due precautions are taken to secure good light, good and safe ventilation, and satisfactory plumbing, this location has proved satisfactory, especially for grammar schools. In large buildings for both elementary and high schools, additional provisions for latrines must be made on the main floors. In high school buildings of more than two stories the prevailing custom, and one that should commend itself to all communities, is to distribute these necessities and place them on the main floors. This method saves time, prevents congestion on stairways and in halls, and with good planning permits of privacy and safe ventilation.

Basements when well planned and well lighted afford good space for manual training work in both wood and iron. These rooms supply convenient and safe storage for materials, and, on the whole, operate to prevent more disturbances from such work than when done in any other part of a building.

As suggested above, where a heating system is installed for a single building, whether a hot air furnace, steam, or hot water coils are used, the best place to locate the furnaces or boilers is in the basement. This method is followed almost universally, except where groups of buildings are sufficiently near each other so that one central steam or hot water plant can be made to supply all of the various buildings.

All machinery for purposes of plenum ventilation are best placed in the basement of the building they are designed to serve. Hence, all the requirements needed must be wrought out in the plans for a basement before construction begins. This point it is necessary to mention because many architects give far less study to the basement plans than they deserve, and when the time comes for placing fans, ventilating ducts, and heating apparatus, serious and almost insuperable difficulties are frequently encountered. Again in small or average sized school buildings the basement affords a good location for shower baths. This location brings them near the most convenient sources for heating the water, and renders the requisite plumbing simpler and hence less expensive. In large high schools, baths can be more conveniently distributed to the various floors. Taking into account all of the above suggestions, — and many others will be obvious, — it does not seem in the least an exaggeration to say that the basements of our modern school buildings are essential and necessary elements in school architecture, and deserve most thoughtful consideration.

Drainage. — All school buildings, as stated elsewhere, should be located on ground higher than that in the immediate neighborhood, and then under-drained so that there will neither be any pressure of water from below the floor of the basement, or upon the foundation walls. Unless this is done, it is almost an impossibility in rainy weather to prevent water from breaking through a cement floor, or at least from keeping the basement walls and floors damp and cold, and also to prevent the entrance of ground air at all times. Generally speaking, it is not expensive thoroughly to drain the ground about a school building, for the work does not often rèquire skilled labor, and common earthen tiles, such as farmers use in underdraining their land, are perfectly satisfactory for this purpose. This drain, however, must have a good free outlet, ought to be laid on all sides of the building about 6 feet outside the foundation walls, and well below the level of the footing for the walls. If this plan is followed, there is no need for drains under any part of the building. Those directly connected with sewers should be placed on the outside whenever possible. It is of course essential for tile drains to remain uncemented at the joints, in order that the ground water may enter and escape through them. It is also a needless expense to fill the excavation for this drain with coarse gravel or broken stone, for the water entering the tiles is all, or nearly all, forced up from below it. It is well, however, to cover these tiles with a few inches of coarse gravel or broken stone, especially if the soil is sandy, to prevent any sediment from filtering through the joints. The rest of the ditch can be filled with the earth taken from it. All eave spouts should terminate at the ground line in sewer tiles carefully cemented together, so that all the water shed from the roof would be carried away from the building. If this is not done, it will be almost impossible to prevent water-soaked basement walls and the troubles incident thereto.

Classrooms. — The classroom has been rightly called the unit of a school building. All other parts of the building are subsidiary to this unit. The size, shape, and construction of a classroom are therefore matters of primary importance. Before any definite plans can be drawn for a school building, the number, size, and form of these units must be determined.

For elementary schools, it is generally conceded that a room 32 feet long, 24 feet wide, and 12½ feet high in the clear, approximates the dimensions demanded by a modern elementary classroom. The following reasons are given for these dimensions: —

(*a*) No child should be at a greater distance than 30 feet from the blackboard at the teacher's end of the room. This demand arises from the fact that if a child is further removed from this board, it makes it difficult for him readily and easily to see the written directions placed thereon by the teacher.

(*b*) Some children find it difficult to hear what the teacher says, even when speaking clearly and with good tones, when they are more than 28 or 30 feet from her. But the difficulty is still more apparent when a teacher has a weak voice, and the quality of her voice has no great carrying power. It is very tiresome for any one to strive to listen, and since children naturally hear less accurately than adults and interpret what they hear more slowly, the importance of this requirement is still more apparent. Bad spelling, faulty pronunciations, and misunderstandings are often due to the inability of children to hear well. Hence the size of the classroom must be adjusted to prevent these troubles. The fatigue arising from the strain of trying to hear is not only annoying and wasteful of energy, but it is the source of careless attention.

(*c*) The width of a classroom should never be more than twice the height of the top of the windows from the floor. This requirement is necessary on account of the fact that the further from the windows a child is seated, the less favorable is the light. A moment's thought will suffice to make it clear to any one that the amount of light that will fall on the books or writing material on those desks furthest removed from the windows is much diminished because of the fact that most of the rays of light entering from the top of the windows cannot reach across the room, and also that those which do so, strike at an unfavorable angle for reflection to the eyes of the pupils so situated. The greater the amount of sky visible by any pupil seated at his desk, the stronger and more satisfactory will the light be, provided, of course, that the windows face in the proper direction and are not too low. Therefore, since unilateral lighting is much to be preferred, and since it is rarely advisable to make the ceilings higher than 12½ feet above the floor, classrooms should not be more than 24 feet wide. Indeed, many authorities set the width limit at a smaller figure. (*d*) The height of the ceiling above the floor should rarely be greater than 12½ feet. The reasons for this demand are the following:—

(1) Every foot uselessly added to the height of a school building more than proportionately increases the cost of the building, for with an increase in the height of the walls, strength must also be increased. (2) Every foot added to a lower story of a school building of two or more stories adds to the height children must climb to reach the upper rooms. This is a hardship on adolescent girls, wastes time in assembling and dismissing children, adds to the danger in case of fires or storms, and increases the cost of maintenance, especially in heating.

If school buildings must be located where the horizon line is raised by hills, mountains, or tall buildings, it is advisable to place the ceiling 13½ feet from the floor, in order that the tops of the windows may be raised 13 feet from the floor. But it is altogether an erroneous notion that there should be a large space above the tops of the windows to keep the room cool in hot weather. An enormous amount of money has been thus wasted in the construction of schoolhouses, especially in the southern states. A ceiling higher than 12½ feet will render a room very little cooler unless the windows are placed correspondingly higher. Classrooms in the top story of a building may be rendered more pleasant in hot climates by making adequate provision for free ventilation of the attic.

Color of Walls. — It has been found, through experience and by photometric tests, that the color of the ceilings and of the walls of schoolrooms above the wainscoting should be a light gray or a light buff color. When walls are tinted thus, the absorption of light is very small and there is no glare or high lights, on bright days. Green or red absorbs too much light, so that, generally speaking, these colors should not be used. A very light shade of green is pleasing, but it fades rapidly and often unevenly, and absorbs more light than a light buff or gray; but a very light and delicate tint of green for the walls of a room receiving abundance of light is permissible. Were it not for the fact that pure white walls dazzle, and offer too sharp a contrast with the page of a book and especially with the blackboards, it would be best to leave them untinted. The chief purpose, then, of introducing any color in finishing the walls and ceilings is to soften the contrast, thereby preventing fatigue of the ciliary muscles and the frequent overstimulation of the retina when the eyes are suddenly turned from a darker to a brighter surface.

Several years ago a committee of prominent oculists of New York City reported to the Board of Education of that city the following recommendations relative to the color of the walls of the schoolrooms: " The red end of the spectrum should never be chosen in the painting or decoration of schoolrooms. The lighter and more delicate shades of yellow or gray should be chosen." Recently a corresponding body of specialists made similar recommendations to the Board of Education of Boston.

A color which will prove satisfactory for home decoration will not necessarily meet the requirements of schoolrooms, and failure to recognize this has introduced much trouble. It is impossible to get too much diffused light in a schoolroom, when walls, furniture, and all finishings are so harmonious as to prevent sharp contrasts. Hence colors which will neither absorb the light nor produce sharp contrasts must have the preference, even at the expense of apparent æsthetic effect, although in the long run, a soft gray, or an inconspicuous buff or yellow tint, will prove more harmonious than more decided colors and afford equal æsthetic effect.

Were it not for the fact that such a large blackboard area is demanded in schoolrooms, it would be possible to vary the color of walls somewhat without harmful effect. And this fact will suggest to thoughtful teachers that in rooms not properly lighted much relief can be offered by drawing light buff or unbleached linen shades over blackboards when they are not in use. Under certain conditions such a precaution may serve to multiply the efficiency of the light by a half.

Where wood is used for wainscoting, it is essential to finish it in what is known as a dead finish, that is, without a high polish, and to retain the natural color of the wood. Where bricks or tiles are used, they must be selected to meet the same demands, for any surface in a schoolroom which will reflect high light, or unnecessarily absorb the light, will prove harmful.

In general it may be said that the ceiling of a schoolroom can be finished in lighter tones than the walls without harm, for this surface is usually outside the field of vision, and the contrast here, even when visible, is between wall and ceiling, instead of blackboard and ceiling.

Floors of School Buildings. — Provision should be made for double floors in all rooms of the first story of a school building, and on all other stories unless fireproof construction is used. Double floors are necessary for several reasons, but chiefly to prevent the entrance of cold impure air forced from the ground through the greater pressure of the air outside the building, and to make it possible to render one classroom free from the disturbances caused by noise in another. One of the most common complaints heard from teachers and pupils in cold weather arises from the uneven distribution of heat in the classroom. A room in which the thermometer will register 70° F. 4 feet from the floor in the middle of the room, and 63° F. at the floor line immediately below, cannot be a healthful or pleasant room in which to work in cold weather. That this is not an imaginary situation will be vouched for by a great multitude of teachers in our country. Teachers who have to move about much in the room find even a greater discrepancy than is here suggested. At a level 5 feet above the floor the difference may be more marked. Such unevenness of temperature will cause disturbances in circulation, and these are forerunners of colds. Besides headaches, the oppressive feelings of working in a high temperature will always be in evidence. Floors therefore must be so carefully constructed that cold air from below cannot find entrance. In all buildings where this inflow is not prevented by fireproofing material, double floors must be demanded. The first or lower layer of such a double floor can be made out of any sort of evenly sawn rough dry timber. The joists should be tight and the boards laid down diagonally to the joists. Between this and the outer floor there should be a good deadener, which will at the same time be impermeable to the inflow of cold air. A good quality of heavy asbestos quilt will serve this double purpose, and it has the added advantage of being noninflammable. The "Cabot Deadening Quilt" made of crisscross layers of eel grass stitched between two layers of paper is a good deadener, and it is claimed will prevent the entrance of ground air. Its construction seems to be such as to warrant its use for this purpose. It is certainly a satisfactory deadener, not only for floors, but for partitions.

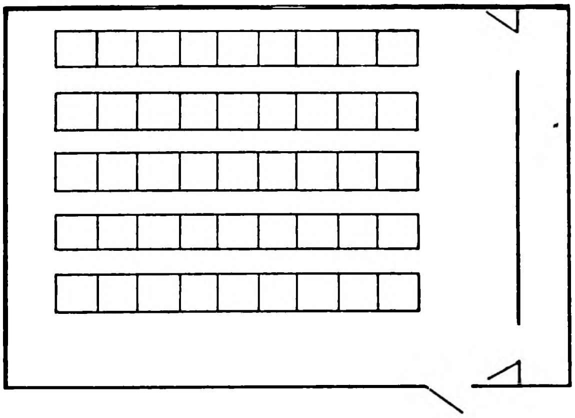
The material to be used for the floor proper is a matter of prime importance, for no other part of a school building is subjected to such rough usage as the floors of classrooms, and none has more to do with the general sanitary condition or appearance of the schoolroom. Good oak floors made of 3-inch boards tongued and grooved and fastened with cut nails are the best; but such lumber has become expensive, and in many cases the price is prohibitive. Hard maple makes good floors, takes a good polish, but is softer than oak and shows the dents of heel tacks. Hard straight-grained pine 2½ to 3 inches wide and laid as suggested above is less expensive and makes a satisfactory floor. But when pine is used some competent man with unquestioned authority ought to inspect every board in order to prevent the use of a single piece showing "slash" grain or pitch gashes. I have seen floors almost ruined by the use of a few such boards, for they will splinter and fill up with dirt in spite of all a caretaker can do. It would be an excellent precaution to have a special supervisor employed when any kind of material is used in laying floors, for American workmen are proverbially careless, and battered floors will inevitably result unless vigorous oversight and unquestioned authority are there to prevent. After a floor has been laid and all the rest of the work of the room completed, it should be planed or sandpapered to a smooth, even surface, and treated so as to receive and hold a wax finish. The "dustless oil" dressing much in evidence these days should be limited to those rooms designed for the lower grades of the elementary schools. When put on lightly, it is effective in preventing dust from rising when the floors are swept, and in this it serves a very useful purpose. But when put on too heavily, it ruins the skirts of the teacher, and if used in the rooms for the upper grades or high schools, it causes much trouble by soiling the skirts of the larger girls. When used, the most competent and careful janitor ought to be detailed to apply it. Teachers can, in a measure, protect their clothing from harm by the use of rugs, but this is impracticable for the larger girls. Where "dustless oil dressing" is not used, a good floor wax should be applied and the floors always swept with a fiber brush after scattering a few handfuls of damp sawdust or scraps of dampened paper over the floor. Dry sweeping is an abomination, and feather dusters should be banished from the school buildings.

In the near future all schoolrooms will be cleaned by some form of suction, and the trouble and danger from dust will be very greatly reduced. All new buildings ought to be constructed with this in view.

Doors. — All doors in school buildings should open outward in order to reduce the dangers from fires. Most states require this by law. All outside doors should be double, and so constructed as to close together in the middle without the need of a permanent upright, so that when both are opened there will be no obstruction left. There are several patent fastenings now on the market which render the doors secure from without, but easily opened from within. These are convenient and are essential for safety. In cities it is almost necessary to keep the main doors of a school building locked during the school session, in order to prevent pilfering by those who are not attending school, but who may readily by one excuse or another explain their presence in a building. By the use of the fastenings referred to there is no added danger in thus locking the doors, for they are not locked from within, and a few pounds' pressure will open them. The doors from the classrooms into halls should be plain, without panels or glass. Paneled doors sag, shrink, and catch dust. They are not so strong as plain veneered doors, which are constructed by veneering on both sides of a solid base made of any strong light wood well seasoned, tongued and grooved, glued and set together with the grain running parallel with the floor. The veneering material will be set with the grain vertical to the floor, and can be selected to match the finish in the classrooms and halls. Such a construction gives a strong light-weight door, which will not sag, gives no ledges for dust, and, when the hardware is in place, makes a more beautiful door than the stock doors everywhere in evidence. Such doors are on the market, and are being used in some of the best school buildings in the country. There is no need of a so-called carpet strip under inside doors in school buildings, and their use ought to be discontinued. They catch and hold the dirt, make it difficult to sweep the floor, cause children to stumble, and in general are out of place. To the objection urged that they are necessary to prevent the door from dragging on the floor, it may be replied that when the floors are level, the door jambs vertical, and the doors set on strong solid hinges, there is no difficulty. The door ought to be set to clear the floor only the fraction of an inch.

It is better to use in classrooms doors without glass set in them, and without transoms over them. Occasionally, where halls would be dark without the light introduced through transoms and glass in the doors, it is necessary to include these in the construction, but where halls are wide and properly lighted, it is better to eliminate all glass from doors. The reasons for this recommendation are these: the ledges introduced by the insertion of transoms catch dust, and the glass is rarely kept clean. Besides, such openings introduce difficulties where mechanical means for ventilation are employed. In plenum ventilation there will be a leakage of air around a transom which will operate to reduce the pressure needed to drive the foul air out through the exit ducts. Classrooms should be private, and hence glass in doors, if used at all, should be ground or non-transparent. When glass is inserted in the doors of schoolrooms, there is always danger of breaking it, for children cannot be expected to be as careful as adults. Even in high school buildings where doors are fitted with a panel of glass, the expense from breakage is not a small item, not to mention the danger implied.

Cloakrooms. — The best arrangement thus far made for cloakrooms in buildings designed for grammar schools consists in cutting off a space about 5 feet wide on the teacher's end of the room, if possible, and communicating with the room by two doors, but having no direct communication with the hall. The illustration shown in the following figure, will make this plan clear.



Location of Desks and Cloakroom for Grammar School.

Such an arrangement gives the teacher complete control of the cloakroom, prevents pilfering from any one outside the room, prevents confusion in halls, and makes it possible to ventilate the cloakroom, thereby keeping the air pure about all articles of clothing, precluding the possibility of the entrance of foul air from such a room into the classroom, and to dry wet clothing. It will be seen by reference to the plan that a large window is arranged to light the cloakroom, and that the doors swing outward into the classroom. An opening in the lower part of each door should be made through which to drive the air. An exit duct should be arranged so as to open above the wraps, and thence into the general exit system above.

It is scarcely necessary to discuss the sort of hooks to use in such a room, but it might be well to say that there are hooks now on the market which are much more satisfactory than the old style of short hooks. These are so arranged that the clothing is not piled together in such a heap, thereby protecting hats, and giving better opportunity for ventilation. These are advertised in many of the current school journals. One of the difficulties common to schools as to other public buildings is that of caring for wet umbrellas and overshoes, for there are thieves in schools, as well as outside of them. Such difficulties may be minimized by the proper construction of lockers, or by small individual compartments without locks, for in the lower grades children cannot be expected to handle a lock and key without trouble. Naturally, some drip basin or trough must be arranged for umbrellas, and some pigeon-hole for overshoes. With these numbered or named there ought to be little trouble. Hats, caps, and wraps are not troublesome by reason of unwarranted appropriation, for here variety is the safeguard, and these are more hygienically placed out of lockers where proper ventilation is more easily secured. In buildings for the grammar grades a common cloakroom is permissible where order and segregation in the lines is maintained; but in high schools separate cloakrooms are absolutely necessary, but this separation introduces some difficult problems. There are many high school buildings, new and old, in which provision for locker rooms has been made in the basement; but this in general is not advisable. In the first place, there is a freedom and a carelessness connected with basements which advise against the use of such a location for locker rooms, especially when such rooms come to be gathering or loafing places. In the second place, it is very difficult to light and ventilate such rooms properly, and keep them free from dampness or odors, especially in wet weather. In the third place, it is rarely possible to make basement rooms as neat and attractive as they should be made. A neat, well-lighted, well-appointed locker room will command a respect and a corresponding deportment which is rarely associated with a dark, disagreeable one. This is a reaction of human nature which must be calculated on, and no teacher has a right to neglect it. In the next place, other things being equal, more thefts and pilferings are associated with basement locker rooms than those on the main floors. The reasons are obvious. On the whole, then, it is wise to plan locker rooms for high school pupils on the main floors. Such a plan is more expensive for small schools, but makes less difference in this regard for larger schools.

It is indefensible to place lockers in hallways for several reasons, chief among which are the following: —

(1) They are unsightly and cannot be ventilated well without much expense.

(2) They obstruct the halls and cause them to be congested several times during the day.

(3) They gather a much greater amount of dust than when situated in closed rooms.

(4) Such a location does not offer sufficient privacy, especially for the girls.

(5) Halls offer one of the best opportunities for the most effective decoration of any part of the buildings and, if littered by lockers, nothing effective can be done. Some day in the near future it may be hoped that public school buildings will serve as an incentive to artists to develop mural painting in this country, and to seize upon this opportunity to make their ideals count for most. In this regard this country is far behind what it should be.

(6) In case of fire the possible attempt of some one to save clothing or books would endanger many. Wide unobstructed hails will soon be demanded by legislative enactment.

With reference to the kind of lockers to use no final word can be said; but a few essentials ought to be specified. They ought to have safe locks, and, if possible, be made of metal connected up with the ventilating system so that under any ordinary use they would remain dry and pure. They ought to be placed against a wall, or, better, built into it, so as to prevent any obstruction of light. They ought to be numbered in such a way that no change would be necessary or possible. Combination locks save much annoyance as the result of the loss of keys, but they sometimes introduce more trouble by reason of careless use, or forgetfulness of combinations.

In close proximity to locker rooms there should be dressing rooms especially for the girls, and such rooms deserve accommodations not necessary to specify here. Neat and tasteful dressing rooms are very helpful agencies in the management and control of public schools, and are worthy of more attention than is usually given to them.

Halls. — The halls of school buildings deserve careful consideration, for perhaps no other part of the school building aside from the assembly room offers better opportunity for æsthetic treatment than do the halls, and certainly no part is more used by the school as a whole. Halls should be well-lighted, broad, and spacious. In this country it is a custom almost universal to place classrooms on both sides of a hall, and, unless such halls extend through the building, they are never well-lighted save where a skylight can be introduced, and this opportunity is limited almost exclusively to the top floor. Dark halls form one of the most notable defects in the construction of modern buildings. The newer types of German school buildings rarely have classrooms on both sides of a hall, and as a result their halls are well lighted and often beautifully decorated. The width of a properly constructed hallway will in part depend on the number and age of the pupils attending the school. In high schools where, at the close of each recitation period, there is a general change of rooms by all students, it is essential that plenty of space is afforded, for nothing will break down the discipline and decorum of a school more quickly than a general scramble and crowding in the halls. Under the old curriculum, where each member of a given class took the same courses, it was possible for teachers to exchange rooms, but since elective courses have been introduced, classes are broken up each period, and it has become necessary for the students to make regular changes. Furthermore, each teacher in larger schools is a specialist and his room is equipped with books and apparatus suited to a special line of work, so that he must remain and the students pass. The main hall of a large high school should therefore be from 14 to 17 feet wide, well lighted from both ends, and must contain no furniture of any sort. Moreover, it is a wise policy to make the wainscoting of the halls of white tiles or light-colored glazed brick. This treatment will not only serve good hygienic and æsthetic purposes, but will render the light more effective and give a dignity to a building well worth all it costs. The floors of halls are very important elements, and deserve special attention. Some of the newer fireproofed buildings use plain hard cement, others decorative tiles set in cement, while still others use broken bits of variously colored marble set in cement and rubbed to a smooth polished surface. There are many advantages accruing from the use of such materials for the floors of halls, which will readily suggest themselves. About the only objections that could be offered are that they are cold, rather noisy, and the initial expense is large. But in the long run they soon save their cost by reducing the amount of labor necessary in keeping them clean, and they last indefinitely. Where wooden floors are used, it is false economy to use anything but the best of wood, such as oak, hard maple, or straight-grained pine free from defects of any sort. If wood is used, a good quality of wax or dustless oil dressing properly applied will serve to protect and keep them neat and clean. Oil dressing can be used in halls with less danger and to better advantage than in classrooms, for in the halls the skirts of the older girls do not come in contact with the floor as they do in the classrooms. The walls of a spacious well-lighted hall in a school building offer a fine opportunity for hanging pictures or for mural paintings.

It is somewhat discouraging, however, when one finds halls littered with hat pegs, or lined with long rows of lockers. Safety in case of fires, economy in time, and the demands of good taste all appeal for wide, well-lighted, well-kept halls. On this point, a large percentage of our school architects need much education, and often require authoritative commands.

Assembly Rooms. — There is at present a well-marked and decided movement throughout the country for assembly rooms, both for grammar schools and high schools. The demand for such rooms has grown out of the desire to accommodate the whole school for music and especially for chorus work, for general lectures, for concerts, for morning assemblies, and particularly to meet the demand for general socialization of our school work.

In no country in the world is there more urgent need for such accommodations than in this, where the theories of education and government are based on the principle of a democracy which exists for the sake of individual freedom and individual initiative. The problem is, how can the citizen live for himself and at the same time maintain a government which will permit other citizens to do likewise? The schools must furnish opportunities for that social contact wherein selfish individualism will be given a chance to realize its shortcomings, and where team work will appear as the best opportunity for all. Student self-government, still in its infancy, will, when properly understood and rationally guided, form one of the most essential features of high schools in the future. Surely no better opportunity could be afforded for developing those elemental qualities of citizenship than in a school where all may have favorable opportunity for personal growth, and where variety of interests and of talent must be conserved in so far as this variety is favorable to the individual and to the group. An assembly room is a necessity of democracy, and on this basis alone is worth more than it costs. But youth needs that quieting, restful influence of music, that poise and insight gained through dramatic expression, and especially those ethical ideals which emerge only when life touches life. It is therefore unhesitatingly and urgently recommended that assembly rooms be provided in every school, elementary or secondary, where a hundred or more young people are brought together. But where should these be placed, and how constructed?

1. Wherever possible, they should be situated on the ground floor, furnished with a large stage, good, comfortable chairs, and so situated as to give all a good view of the stage and the room as a whole. The prevailing custom in Germany is to make the floors of their assembly rooms flat, while in this country the tendency is to provide a sloping floor. Balconies or galleries about an assembly room in foreign countries are the exception; here it is the rule. In these matters, and from our point of view, we have the advantage. In the German schools it is almost universal to place the *Aula* or *Festsaal* on the top floor of the building; here a decided movement is now dominant to place them on the first floor. Here again there is an advantage, for safety, accessibility, and economy of construction demand the location of an assembly room on the first floor. But this location introduces some architectural difficulties not easily overcome. For example, it is more difficult to secure good light for an assembly room situated on the first floor than on the second or third, and especially if it occupies the central part of the building.

The solution of this problem has taken several forms, but the so-called "H" or "E" form of building has made it possible to place the assembly room on the main floor and at the same time to get good light and afford every convenience necessary. The following description of the position and lighting of the assembly room in a medium-sized building for the La Crosse High School will illustrate the solution suggested above: Directly across the center of the main corridor and opposite the main entrance is the auditorium, which occupies the space of the first and second floors at the center of the building. It is 51 by 76 feet, exclusive of the stage. The main floor is provided with 600 opera chairs, and the balcony will accommodate about 250. The skylight and the courts on either side give abundance of light, and the arrangement of aisles with access from each of the three corridors facilitates the rapid assembly or distribution of the school. This is what might be named a typical modern assembly room for school buildings, as to position, lighting, and accessibility. When such rooms are on the first floor above the basement, it is comparatively easy to drop the stage end of the room lower than the level of the first floor for the rest of the building, thereby securing without waste of space or undue expense the great advantage of a sloping floor. To secure this form of construction when assembly rooms occupy space on the second and third stories necessitates much extra expense and often unwarranted forms of construction. The smaller schools of the country have in the main been content with "big rooms," for assembly halls, differing from classrooms only in size; but having learned that the first floor is more economical for such rooms, and that the most satisfactory form of construction is best attained when assembly rooms are situated on the main floor, it seems highly probable that there are here the beginnings of what will become the standard position and construction of assembly rooms for public schools. The main reasons assigned for this anticipation are these: —

(1) Assembly rooms will become more and more a center for general educational endeavor, especially for public lectures, evening schools, and evening entertainments in competition with the cheap and often vulgar "shows" of the moving picture and vaudeville type. Hence, in order to save the building and permit of easy access, they must be on the first floor. (2) The danger in case of fire is greatly lessened by this position. (3) The heating and ventilation of a room so situated is more easily effected than when removed farther from furnace and fan. (4) It is much less expensive to secure safe and solid construction for the main floor of an assembly room when supports can be set directly beneath the floor than when interference with the space below necessitates scattered supports or heavy beam construction. (5) Such a position brings the balcony on a level with the second floor, and on the whole brings the assembly room closer to the main classrooms than if placed higher in the building. (6) This position permits of the construction of a number of exits from the main floor not possible when placed higher. For example, separate entrances and exits from the stage will often save much time, inconvenience, and trouble. (7) The general public will more readily attend lectures and evening classes when held in rooms directly accessible from the first floor than when one or more stairs must be climbed.

Stairways. — In two-story buildings designed for high schools there should be at least two stairways from the first floor to the second, and more in large schools. These stairways ought to be situated as near the ends or outer walls of the building as the plan of construction will permit. For when so located there is a natural division of the students into groups, and, generally speaking, this, in case of panic, will prevent that congestion on stairs and landings which is the nightmare of all teachers who take precaution against loss of life in case of fire. Besides, this location facilitates passing up and downstairs between recitations. One hundred students in double file can easily descend a broad, well-lighted stairway in 35 seconds, and with proper fire drills can reduce this time to some extent and with all safety, so that they can emerge from the building in a minute to a minute and a half. Experience has shown that a thousand children in a two-story grammar school building, furnished with four stairways, can be trained to get out safely in a minute, if the stairways are properly placed and wide enough. Another reason for placing the stairways leading to the second floor near the ends or opposite sides of the buildings is the fact that fires as a rule originate in the central part of the building, or, if they do not originate there, the smoke is likely to seem to gather there and render a central stairway dark and forbidding. There is, moreover, a better chance for light near the outside walls, and less inflammable materials, especially in brick, stone, or cement construction.

The stairways should be of fireproof construction, especially in a wooden building. The prevailing custom is to make wooden stairs in wooden buildings, and more resistant stairs in stone, brick, or cement buildings. A moment's thought is sufficient to show that in this regard wooden buildings need greater care in the construction of stairs than any other sort of building.

It is in no sense unreasonable to insist on fireproof stairs in all large two-story buildings, especially now that the material is within reach of all. Steel frames incased in cement and with treads made of the same material render stairways reasonably safe against fires, and also insure much greater permanency. The width of a stairway will of course depend in part on the number of students it is designed to accommodate; but in all cases it should be wide enough for two adults to ascend or descend abreast without crowding. In large schools there should be room for three adults on the same tread at once. In general, 5½ to 6 feet in width will give plenty of room save in very large schools. The height of the riser should not exceed 6 inches, and the width of the tread should be not less than 10 inches in the clear, while 12 inches is better. There should be a rectangular landing halfway up, and this should be in width nearly if not quite double the length of the tread. Such a width will help to prevent blockades in case of fire, and will insure better light on the stairs. It may be said here in passing that the habit of decorating this landing with potted plants, box seats, etc., needs questioning. If plants can be placed safely out of the way, there can be no objection offered. Some day it may be hoped that the walls above these landings as well as in the hallways will be decorated with mural paintings of a worthy sort, and then they will not seem so bare and cheerless. Much has been written on the question of whether or not stairways should be boxed in or finished with openwork surmounted with a handrail. Those favoring the former method have cited instances where children have fallen over and received serious injuries where open balustrades have been used. But the danger from this sort of construction seems very slight indeed where due care is taken to make these high enough and sufficiently strong. The most objectionable feature of the open balustrade along stairways is the fact that in mixed schools they do not sufficiently shield the girls, as they ascend, from exposure to the view of those on the lower half of the stairs. At the high school age, girls still wear short skirts, and in mixed schools, stairways thus constructed furnish opportunities which may be very objectionable. On the other hand, the boxed-in stairway is much darker and far less acceptable from the standpoint of appearance. It therefore seems wise in building for mixed schools to recommend a balustrade with the lower part solid and the upper part more open.

The prevailing custom in the newer buildings is to make these balustrades of iron wrought into more or less elaborate patterns. The matter of keeping stair railing free from dust ought to suggest to builders the need for designs easily cleaned as well as beautiful.

When stair treads are made of cement, the corners next to the risers ought to be left rounded or less angular instead of square, in order to facilitate cleaning. Dirt caught in rectangular corners is hard to remove, and by reason of this fact is often left undisturbed. Where wooden stairs are used, triangular pieces of tin made to fit the corners closely save much work in sweeping, and give better results in cleanliness. It is a wise procedure, in the construction of fireproof stairways, to use the very best cement so that the treads may resist wear, stand level or nearly so, and especially to render the exposed edges strong and nonslippery. Handrails are needed on the wall side as well as along the outer side. These, however, should not extend more than 3 or 4 inches from the wall, and should be at least 3 feet high above the tread. They are often too low to offer satisfactory protection in going down the stairs.

The short flights of steps through the main entrances to the first floor need to be wider than those in the stairways proper, and can be constructed of stone or cement. The back stairways leading from the first floor to the basement can be more safely placed near the center of the building, for they are not likely to be used in case of fire.

Lunchrooms. — Since the introduction into the curriculum of courses in cooking, especially in high schools, the lunchroom has made its appearance and now occupies a legitimate space in most well-equipped high school buildings. In many of the European schools, lunchrooms are constructed in buildings for elementary classes, in order to serve without cost a midday meal to those children whose families cannot afford the expense, or to serve a light warm meal to those who can afford to pay for such service. Several cities in our country make like provision for poor children as well as for those in more fortunate circumstances. But the lunchroom in this country is more generally found in buildings for high schools. Aside from the necessary cooking equipment, these rooms deserve good light, good ventilation, and tasteful decoration. It seems unfortunate that so many of these rooms have been placed in basements where lighting is often poor, where the air is generally impure, and where the environment is not altogether wholesome or inviting.

Cooking and lunch rooms ought to be combined and situated on one of the main floors, preferably the top floor in buildings of two stories, and due provision made for receiving the supplies by means of a lift. A meal hurriedly prepared or "bolted" in a dark, unattractive room cannot recommend the sort of hygienic living for which our whole educational scheme should stand. The chief reasons given why basement rooms have been chosen are these: when so situated, supplies are more easily delivered, storeroom is more readily secured, and it has been easier and less expensive to install the ranges and other cooking appliances. But with the development of gas stoves and heaters it is now a comparatively easy matter, where gas can be supplied, to locate cooking rooms in more attractive parts of the building, and in the future it seems altogether likely that such rooms will be given more thoughtful consideration.

Other aspects of School Architecture not relating directly to the construction of the framework of the buildings will be treated under special headings. Thus, see articles on Desks and Seats; Drinking Fountains; Heating and Ventilation; Latrines; Lighting; and the various topics on Hygiene of the School.

F. B. D.

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ARGENTINE REPUBLIC, EDUCATION IN THE. — Historical. — The Argentine Republic dates its independence from 1810, although the separation from Spain was not formally declared until 1816. Prior to this time the territory was a Spanish possession, forming the most important part of the viceroyalty of Rio de la Plata. The first Spanish settlers in this fertile region came from Peru, and introduced the system of clerical education already established in the northern colony. Its chief agencies were the teaching orders of the Church, the Jesuits, Franciscans, and Dominicans, whose numbers were subsequently increased by direct arrivals from the mother country. The King of Spain, although the head of the religious instruction by virtue of his right of patronship, respected the autonomy of the institutions conducted by the clergy, and the apostolic approbation of the Pope was always sought in founding universities.

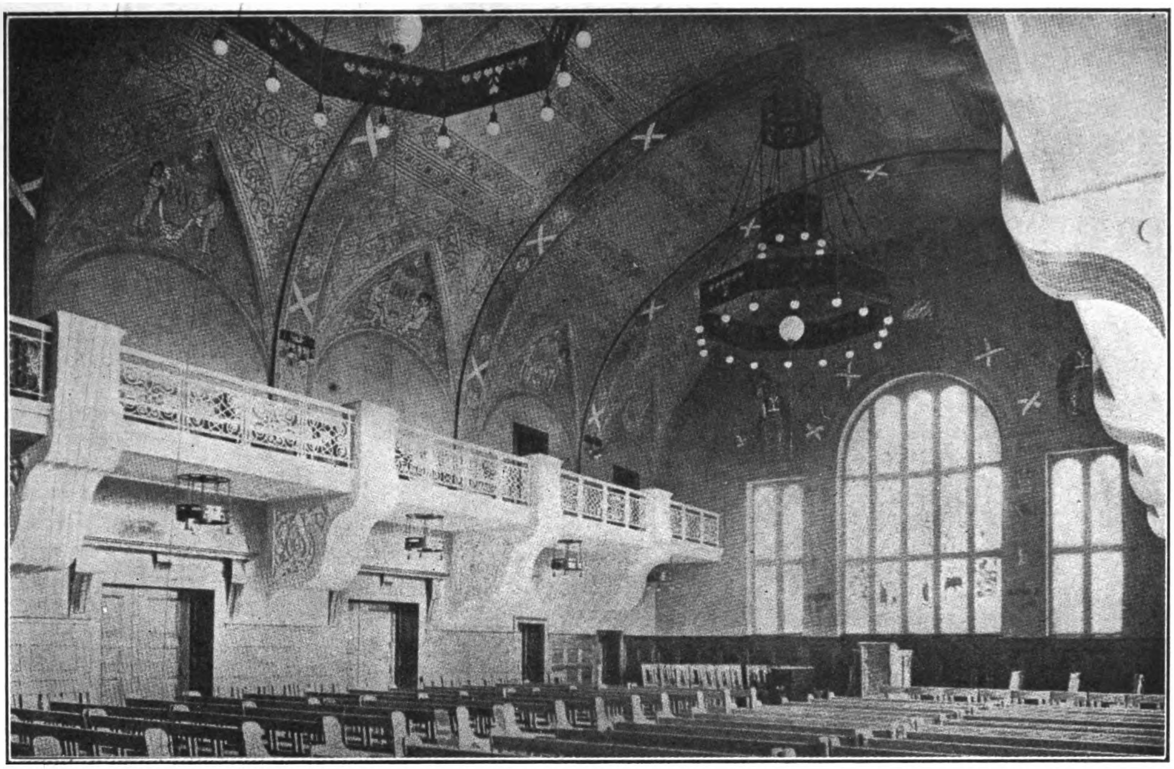
The purpose of the clerical instruction was twofold: first, the conversion of the Indians, or, at least, their transformation into obedient vassals; second, the maintenance among the Spaniards themselves of their religious and intellectual inheritance. As regards the Indians, the efforts of these religious teachers were of chief consequence by reason of their effects upon the "mixed bloods," descendants of Spaniards and Indians, who were thus early imbued with the ideas of the superior race and assimilated to its higher social order.

While there was no organized system of education in the Spanish colonies, the course pursued was practically the same in all. At Cordova, a city founded in La Plata in 1573 by Spaniards from Peru, the Jesuits established the *Colegio Maximo* in 1609, and this became the controlling center of education in the province. In 1614 the institution was raised by pontifical and royal decrees to the dignity of a university, and in 1622, by order of Philip III, was authorized to grant the degrees of bachelor, licentiate, master, and doctor. The faculty of civil law was not added till the eighteenth century, authority to confer degrees in law being granted in 1796.

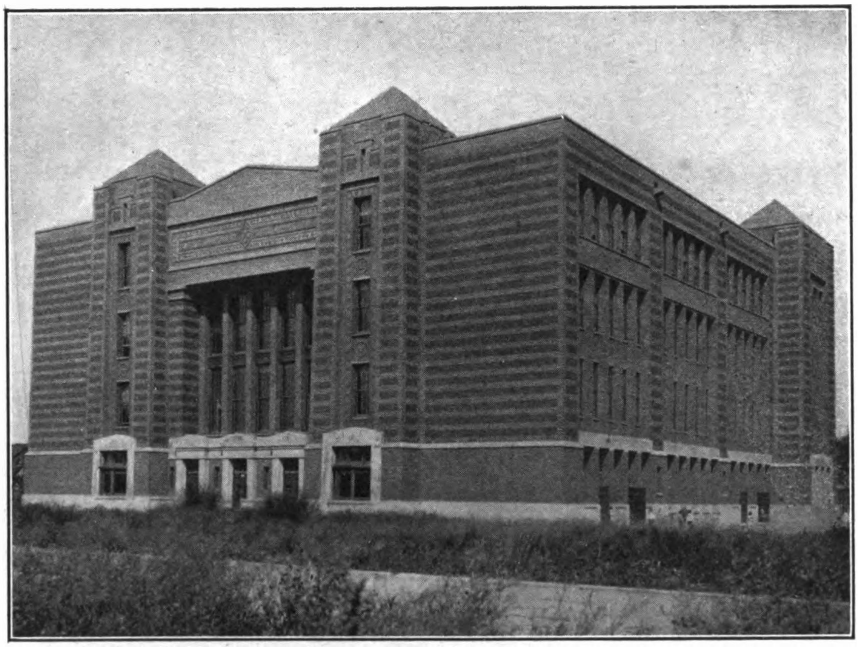
Upon the expulsion of the Jesuits by decree of Carlos III in 1767, the institution with its affiliated colleges was given over to the secular clergy. Subsequently, it was transferred to the Franciscan order, in whose charge it remained until the nineteenth century. Secularized by a royal decree of 1800, which took effect eight years later, the university entered upon a new era under lay auspices, and with a new scheme of instruction. The philosophical faculty was extended to include the experimental study of physics, and the course in this faculty was made a prerequisite to the studies of theology and law.

The second university, that of Buenos Aires, was formed by the union of several struggling institutions in 1821, soon after the organization of the provisional government. The influence of the university system established by Napoleon in France was reflected in this new foundation, which was charged with the administration of official instruction in Buenos Aires from the elementary schools to the highest faculties.

These university movements were signs of the reaction against the old régime due to inherent impulses toward liberty stimulated by the philosophical and political doctrines then rife in France; for in spite of royal prohibitions the ideas of the French encyclopedists, and the speculations of Montesquieu, Rousseau, and Voltaire, penetrated the distant province. When the revolution was accomplished, however, the patriotic leaders turned to the United States for sounder principles to guide in the formation of a republican government. The constitution adopted by the republic in 1853 expressly provided that primary schools should be established in each of the federated provinces. This provision was made obligatory upon the states by the constitution of 1860, adopted after Buenos Aires joined the federation. The importance of education as a factor in the national life was recognized by the creation of a ministry of public instruction in the



Assembly Room (*Aula*) in Gymnasium at Zehlendorf, Germany (showing mural decorations).



Tilton School, Chicago.

newly formed government. From the extent of the country, the sparse population, the want of democratic traditions, and of immediate incentives, the cause of primary education languished, excepting in the capital city, where this interest was under the direct control of the federal government.

The vigorous movement in behalf of popular education which gave Argentina the leadership in this respect in South America was excited by the efforts of President Domingo Faustino Sarmiento. In a period of exile during his romantic career, Dr. Sarmiento was commissioned by the Chilean government to study the systems of education in the United States and Europe. While on this mission he formed intimate acquaintance with Humboldt, Guizot, Cobden, and Horace Mann. Subsequently, he represented his country as minister plenipotentiary at Washington, and from this mission he was recalled in 1868 by his election to the presidency of his country.

Among the measures advocated by this eminent statesman for the development of the republic, popular education held the chief place; two essential conditions of an efficient system of public instruction were secured by his personal efforts. He gave national direction to the work by means of liberal appropriations from the public treasury in aid of schools in the several provinces of the republic, and at Paraná, capital of the province of Entre Rios, he organized a normal school of modern type in charge of a group of teachers called from the United States to assist in the enterprise. The law of 1873 passed just at the close of his presidential term placed the policy of national aid for primary education in the several provinces upon a permanent basis.

In 1884, ten years after the close of President Sarmiento's term as chief executive, the law was passed by which the present school system is regulated. The measure was national in scope, but on account of the constitutional independence of the several provinces in respect to this interest its direct application was limited to the capital city and sectional territories under the immediate control of the national government, and to schools in the provinces sharing in the government subsidy. The national law has served, however, to bring about a fair degree of uniformity in the several provincial laws.

The difference in their historic origins explains the continued distinction between the two departments of the general system of education in the republic, the one comprising the primary and normal schools, the other, the culture and professional schools of the country, corresponding to the old universities and colleges. Intermediate between the two groups are the recently organized commercial and technical schools.

Present Systems. — *Primary Schools.* — The federal government administers primary education through the national board of education (*Consejo Nacional de Educación*) which was formed in the ministry of education in 1881. This board is assisted by a body of inspectors, who must be graduates from the highest normal course, and must have had several years experience in teaching in the public schools. The inspectors visit and report upon all schools maintained by the central authority. In the capital city the primary schools have attained a fair degree of efficiency, and illustrate most fully the provisions of the law of 1884. Instruction is obligatory for children 6 to 14 years of age, either in public schools or by private agencies; public primary schools are gratuitous, and are organized in six one-year grades, or classes. Each class must have a minimum attendance, *i.e.* 25 pupils in grades 1 and 2; 15 in the higher grades. Coeducation is allowed only in the three lower grades. The course of study must conform to an official program drawn up by a select committee of teachers, inspectors, and school physicians. The schools are nonsectarian, but the clergy of the different denominations may be admitted to give religious instruction before or after school hours, a privilege which is chiefly exercised by the clergy of the state church, *i.e.* the Roman Catholic.

Candidates for teachers' positions must be provided with a professional diploma, a health certificate, and a certificate of high moral character. Salaries are arranged in three grades, promotion being determined by merit and length of service. Teachers have a right to a pension after 20 years of continuous service.

There is a local school board for each of the 22 precincts of Buenos Aires, which has direct control of the schools of the district. Medical inspection of schools is intrusted to a medical corps appointed by the national board. The primary schools subsidized by the federal government in the several states form in each a group of model schools conforming as closely as possible to the provisions of the school law of 1884.

The actual status of primary education according to the latest official report is indicated by the following table. The proportion of children not attending school, as shown by the table (columns 10 and 11) and the high degree of illiteracy (affecting 50.5 per cent of the population over 6 years of age, in 1905), are exciting alarm. At present there is a strong movement toward increase of central control over primary education; even the complete nationalization of primary schools is advocated.

During the fiscal year 1907, the national board expended $4,212,419 for the establishment and maintenance of primary schools in the federal capital, in the territories, and for primary schools in the states, supported by national funds.

Normal schools, which form a very important feature of the Argentine system of public instruction, are a link between the primary

TABLE I. — PRIMARY SCHOOL STATISTICS OF THE ARGENTINE REPUBLIC, 1907

Local Divisions	Population Dec. 31, 1905	School Census		School Attendance				Children of School Age not attending School		Percentage of Children of School Age not attending School	
		Calculated on basis of school age determined by national law, 6–14 years	Calculated on basis of school population as determined by local law [1]	In schools supported by federal Government	In schools supported by provinces	Private schools	Total	On basis of standard set by national law, 6–14 years	On basis of standard set by law of the provinces	On basis of standard set by national law, 6–14 years	On basis of standard set by law of the provinces
	1	2	3	4	5	6	7	8	9	10	11
Provinces (14) . .	4,688,607	937,717	744,363	50,544	325,829	77,292	453,665	484,052	290,698	51.62	39.05
Territories (10) . .	201,884	40,372	40,372	12,581	——	1,051	13,632	26,740	26,740	66.23	66.23
City of Buenos Aires	1,084,280	216,856	216,856	90,268	——	45,000	135,268	81,588	81,588	37.62	37.62
Total	5,974,771	1,194,945	1,001,591	153,393	325,829	123,343	602,565	592,380	399,026	49.56	39.83

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[1] Under local laws, school age varies, the shortest period being 6 to 12 years, and the longest, 7 to 15 years.

schools and the higher institutions. By reason of their academic studies and their administration, they may properly be classed with the secondary institutions. The federal government maintains one normal school in each state and provides scholarships in the normal schools maintained by local authorities. All schools of the class conform to the official program and are subject to government inspection. They number at present 35, of which 6 are at the national capital and wholly under government direction. Of the total number, 4 are for men only, 18 for women, and 13, including one school at the capital for teachers of modern languages, are coeducational. The number of students in the normal schools in 1905 was 2011.

These schools confer two grades of diplomas, one at the end of a four years' course, and the other at the end of six years, to graduates who are called "normal professors." From this class of graduates the government school inspectors are selected.

Secondary . Education. — Public secondary education is provided in *colegios*, 25 in number, established and maintained by the federal government. The official program of these institutions, which is arranged for a course of five years, is correlated with that of the national primary schools and prepares for admission to the specialized university courses. The studies comprised are mathematics, the sciences, Argentine history, modern languages — French, English, and Italian — in addition to the native Spanish, drawing, manual arts, and gymnastics. To these subjects are added, in the fourth and fifth years, general history, ancient and modern, geography of Asia and Africa, psychology, civic instruction, and philosophy. The course has an essentially modern character corresponding to that of the modern high schools of our own country, and to the scientific and modern language course of the French lycées. Pupils are expected to enter at 12 years of age and to be ready for the university at 17 or 18.

The deep interest of the government in the cause of modern and scientific education is shown by the efforts lavished upon these secondary institutions. They are provided with imposing buildings and ample equipments, and receive liberal appropriations from the public treasury. In 1908 this allowance reached a total of $1,386,000, of which amount nearly $550,000 were expended on the five *colegios* in the federal capital. The *colegios* of the smaller towns illustrate very clearly the defects of the present organization. These are unstable, overcrowded, with ambitious programs, and are influenced by the peculiar mode of appointing professors. The subjects of instruction are divided into *catedras*, or chairs, each chair including a minimum of three hours of instruction a week. The chairs are usually divided among the resident lawyers and physicians. Under such a system, the professors have little personal influence upon students and little or no professional spirit and solidarity.

The school census of 1905 gave 4103 students in 16 of the public secondary schools, an average of 256 students to each school, which would only be attained in the larger cities. The students in these national schools are drawn from the humbler social classes, the patronage of the leading families going preferably to the older classical colleges which are still managed by the various religious orders, Jesuits, who returned to the country in 1836, Redemptionists, etc. The courses of instruction of these private secondary schools are necessarily determined by the official entrance requirements and the degree examinations of the universities, but with provision for modern studies they still retain the classical humanities. They number 450 as against 190 public *colegios.*

The interest of the government in the "higher education" of young women is indicated by the establishment of two national secondary schools, *liceos*, one at Buenos Aires, the other at La Plata. They follow the crowded program of the *colegios* with the addition of music and domestic science. It needs hardly be said that the majority of young women in Argentina are educated in convents and church schools.

Commercial and Industrial Schools. —The efforts of President Sarmiento to modernize education in Argentina were ably seconded by his minister of public instruction, Doctor Avellaneda, who pointed out the fact that industries owe their perfection to scientific knowledge and that manual labor must go along with instruction in the sciences; he illustrated his position by the then recent universal exposition of 1867 in England, where could be seen the results of such combination. Doctor Avellaneda insisted that it was necessary to keep in mind the peculiar needs of Argentina in introducing technical instruction into the country, and accordingly such instruction was inaugurated by creating departments of agriculture in the various *colegios*, together with departments of mines, which latter had an ephemeral existence but led to the establishment of a national school of mines.

In 1889 manual training was introduced into several *colegios* and was made a part of the course of instruction in national primary schools by programs drawn up in 1890. The movement was fostered by the Association for Industrial Education and by the religious societies, and finally two national industrial schools were organized, one at Buenos Aires, the other at Rosario. The government also maintains three trade schools for girls at Buenos Aires, and, stimulated by these examples, local authorities are giving serious attention to this branch of public instruction. The importance of commercial training has but recently been recognized in Argentina, but already three commercial schools have been established at the capital (two for men and one for women), and several similar schools in provincial cities.

Agricultural Education. — In 1871 a department of agriculture was created with the special object of diffusing a knowledge of all things relating to agriculture throughout the country; but little was effected in this way, principally through want of funds, until this department was converted, in 1899, into the ministry of agriculture, in which was included a division of instruction. Since then a number of schools of agriculture have been established in the different provinces, with plantations, vineyards, and the other necessary equipment, in which instruction is given both in theoretical and practical agriculture.

The advantage which the federal capital enjoys from the fostering care of the government is illustrated by a group of special secondary schools whose names sufficiently indicate their general character. The most important of these are the National Institute for Secondary Teachers, the National Academy of Fine Arts, and the Normal Institute for Physical Culture.

Higher Education. — Higher education imparted in the universities and superior technical schools is under the immediate control of the federal government. The two universities already mentioned, Cordova and Buenos Aires, were reorganized by the republican government somewhat after the model of the French faculties as constituted by Napoleon. The want of vital union between the faculties led to the same narrow specialization that was long the bane of higher education in France. To correct this tendency a different system was adopted in the organization of the National University of La Plata, established in 1906. This university forms an organic body under a president who has supervisory powers over all the faculties.

Each of the three universities comprises a faculty of law, a faculty of philosophy and letters, a faculty of natural sciences, and a faculty of physical and mathematical sciences. Cordova and Buenos Aires have also a medical faculty. The programs, degree examinations, etc., are regulated by official programs. The University of La Plata, like the national *colegios*, is wholly modern in character, and the high standards maintained and the close organization of the several faculties will in time, it is believed, impart a more solid character to the modern scheme of secondary instruction. The three universities have a registration of about 3500 students. They are maintained exclusively by federal appropriations. There are no tuition fees, and the matriculation and graduation fees are very low. For the year 1908 the appropriations were as follows: University of Cordova, $276,825; University of Buenos Aires, $449,350; University of La Plata, $430,000.

The government is exceedingly liberal in the matter of capital expenditure for the universities, and has recently adopted plans for magnificent new buildings for the faculty of physical and mathematical science (which includes engineering) of the University of Buenos Aires; for the erection of a new hospital costing $6,000,000 to be an adjunct to the medical school; and for a series of new buildings to commemorate the tercentenary of the University of Cordova. The higher technical training is imparted in the school of mines reorganized in 1897, a college of agriculture, and a naval and military school, all under government control.

The recent development of technical education, and the general awakening to the importance of scientific education in its relation to industrial progress, indicate the increasing influence of the methods and ideals of education in the United States as contrasted with the traditional literary spirit of the older schools. This tendency has been stimulated by the National Pedagogical Museum, located at Buenos Aires, which secured much illustrative material from the St. Louis Exposition of 1904. The early scholastic relations between the Argentine Republic and the United States are illustrated by the fact that Dr. Benjamin A. Gould was appointed the first director of the National Observatory, which was founded at Cordova in 1865 and has achieved great distinction in astronomical science.

Art shares with science the liberal patronage of the Argentine government, which is preparing to celebrate its centennial by an international art exhibit to be held at Buenos Aires from May to September, 1910.

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ARGUMENTATION. — See Composition and Rhetoric.

ARISTOPHANES. — Censor, satirist, and poet, born probably at Athens at an uncertain date, perhaps 448 B.C. Aristophanes was animated by a more serious purpose than is to be expected of the Old Comedy in general. His sympathies were conservative and aristocratic, and in the *Clouds* (423 B.C.) his full genius is directed against the spirit of intellectual investigation that is connected with the names of Socrates and the Sophists. The older school of natural philosophers offered a legitimate subject for ridicule, but the full animosity of the poet is directed, not against Heracleitus and Anaxagoras so much as the doctrines of the social philosophers and teachers of rhetoric, such as Protagoras, Prodicus, Gorgias, and Hippias. Socrates is taken as the type of the new thought in all its branches. Thus the *Clouds* becomes a document of great interest in the history of education. A youth, Phidippides, is sent by his father to learn of Socrates, whose doctrines finally render him an accomplished rogue, a rôle, however, for which he is clearly destined by nature from the beginning. The education of Phidippides is to be in the two causes, " the better, whatever it may be; and the worse, which, by maintaining what is unjust, overturns the better. If not *both*, at any rate the unjust one by all means."

Next to the *Clouds*, the most important drama of Aristophanes, regarded from the educational viewpoint, is the *Frogs*. Here Æschylus and Euripides are revealed in the course of an argument in which they criticise passages in one another's work. Euripides objects to the bombast of his predecessor, and claims to have made tragedy more intimate and domestic; Æschylus retorts with charges of skepticism, sophistry, and morbidness. The *Frogs* contains another passing attack on Socrates. Aristophanes throws many sidelights on Greek life and education.

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ARISTOTLE. — Born at Stageira, a city of Chalcidice, in 384 B.C. His father was physician to King Amyntas of Macedon, and he doubtless received the elements of a scientific education from him. At the age of 18, he was sent to Athens, which had lost most of its political importance, but was now recognized as the chief center of higher education in Hellas. There he joined the Academy, which had been founded by Plato (*q.v.*) some twenty years earlier, and was now attracting students from every quarter of the Greek world, and he remained a member of the society till Plato's death in 347 B.C. Like many other students of the Academy, he also attended the other great educational institution of Athens, the school of Isocrates (*q.v.*). When Plato was succeeded by his nephew Speusippus, Aristotle left Athens with Xenocrates, and betook himself to the court of Hermeias of Atarneus, one of the many princes who had been trained in the Academy. Four years later, when he was living at Mitylene, he received a call to undertake the education of Alexander of Macedon, then a lad of 13, and this engagement seems to have lasted for 3 years, at the end of which time he returned to Stageira. In 339 B.C. Speusippus died, and was succeeded in the headship of the Academy by Xenocrates, and 4 years later Aristotle returned to Athens and founded a rival school in the Lyceum. Most of the writings which have been preserved are the lectures which he prepared for delivery in the school, though he also wrote other works, for a wider public, which are often quoted. On the death of Alexander (323 B.C.), the anti-Macedonian party forced Aristotle to leave Athens, and he died the next year near Chalcis in Eubœa.

Aristotle's practical experience as an educator thus falls into two well-marked stages, his tutorship to the young prince, and his headship of the Lyceum. It is not likely that he had any great influence over Alexander, and his allusions to the unpleasantnesses of court life suggest that he did not feel at ease in the position as governor of a prince. In any case, the ideals which inspired Alexander were by no means those of Aristotle, as we know them from the *Politics* and elsewhere, but rather those of Plato and Isocrates. It was Isocrates who had preached, in season and out of season, the gospel of a regenerated Hellenism founded on the conquest of the Persian Empire; and Plato's views were similar, though he busied himself chiefly with the other side of the same problem, the preservation of Western Hellas from the Carthaginians. Such ideas were quite foreign to Aristotle's mind, and he nowhere shows any interest in the work which his illustrious pupil was doing during the years when he was lecturing in the Lyceum. Indeed, he barely mentions him at all; for the *Rhetoric dedicated to Alexander* is not his work, and the prefatory epistle is a forgery. In two important respects his views were diametrically opposed to those of his pupil: he regards the distinction between Hellenes and barbarians as fundamental, and he still clings to the old ideal of a self-sufficing city state. He nowhere shows the least appreciation of the fact, which was clearly seen both by Plato and Isocrates, that the rising power was military monarchy.

Aristotle's work as head of the Lyceum was of a more fruitful character. It is true that the Lyceum was far less successful than the Academy in training practical legislators and statesmen, but it soon became a great center of research, especially in biology and history. Speusippus had no doubt led the way in biology; but, on the whole, it is true to say that zoölogy was the creation of Aristotle, while the foundations of botany were laid by his associate and successor, Theophrastus. The indifference of the Lyceum to the advance made by the Academy in mathematics prevented it, indeed, from contributing much to the exact sciences, and Aristotle's astronomical and cosmological teaching was distinctly retrograde; but in everything that depended upon the accumulation and classification of facts and observations the Lyceum easily led.

Aristotle's scheme of education is taken in the main from Plato, and in particular from that given in the *Laws*, for which the reader may be referred to the article on Plato. What must be noted especially here are the points of difference, which present several features of interest.

To Aristotle, as to Plato, education is a branch of the practical science of politics, that is, the art of securing happiness (εὐδαιμονία) for a community of citizens. There is an important difference, however, in the way in which Aristotle regards this end. To Plato it was a good " state " or " condition " of the soul (ἕξις τῆς ψυχῆς); to Aristotle it is rather the "activity" (ἐνέργεια) proceeding from such a state. This does not mean, however, that Aristotle's ideal was more practical than Plato's. On the contrary, we find that to him the highest form of activity is "contemplation" (θεωρία), while Plato always insists that the results of scientific contemplation must be made serviceable to the community and to mankind. Both Plato and Aristotle, however, are agreed that two kinds of goodness, which Aristotle calls goodness of character and goodness of intellect (in scholastic phrase, moral and intellectual virtue), are necessary, and that the first is to be produced by habituation (ἐθισμός), the second by teaching. As this implies that we must do good things before we are good, in order to become good, the necessity of education is apparent.

This subordination of education to politics has some very important consequences. Plato had given a scheme of education for the " Guardians " in the *Republic*, which deals with the ideal state; in the *Laws* he set himself to construct a second-best state, and the scheme of education differs accordingly. In the same way, Aristotle teaches that each form of state — aristocratic, democratic, and the rest — has a special kind of education appropriate to it. It is only in the best state, where the good man and the good citizen are identical, that the right education will necessarily be that which is best for the individual as such. It will also follow that education is a matter of public concern and cannot be left to private control, though Aristotle admits at the end of the *Ethics* that, in an imperfect state, where education is neglected, fathers of families must do their best to perform the functions of domestic legislators.

Aristotle's scheme, so far as it is preserved, is to be found in the Seventh and Eighth Books of the *Politics*, and follows very closely on the lines of Plato's scheme as given in the Seventh Book of the Laws. Both begin with infancy, though Aristotle does not go nearly so much into detail on this subject as Plato. A milk diet, plenty of movement, and exposure to cold are his main points. Up to the age of 5, the child is too young for compulsory exercises of any sort; these would only hinder its growth. Games are the chief means of education at this stage, and these must be approved by the Inspector of Children. Aristotle agrees with Plato that they should for the most part be imitations of what the child will have to do when it is older, but he thinks it a mistake to try to prevent children from crying and kicking freely. These things help their growth. Aristotle clearly assumes that the children are to be brought up at home, and not in public infant schools, as Plato proposed; but he has a strong feeling of the danger of letting them associate much with servants, and he insists that they must be safeguarded from all indecent words and sights. From the age of 5 till that of 7, they should look on at the exercises in which they will soon have to take part.

Education proper begins at the age of 7. We have seen already that it is to be under public supervision; but "there is a dispute about subjects" (*μαθήματα*). Are we to keep the intellect or the character chiefly in view? Are we to regard the utility of the subjects, or some higher quality in them? Aristotle seeks to answer these questions by considering the subjects actually taught in his time. These are (1) reading and writing, (2) gymnastics, (3) music, to which some add (4) drawing. Reading is plainly to be justified on utilitarian grounds, and so is drawing. Gymnastics is supposed to make brave soldiers. When we come to music, however, it does not appear to have any direct utility, so there is at least one of the commonly received subjects which must be justified on other than utilitarian grounds. Nor is the value of the others purely utilitarian. Reading has a higher end, and so has drawing. It serves not merely to save us from making blunders in our purchases, or to prevent our being cheated in buying or selling furniture, but also to train us in the perception of bodily beauty.

The education of the body must precede that of the mind, so gymnastics and drill are essential at this stage. We must be careful, however, not to allow hard and brutal exercises, which spoil the children's appearance and stunt their growth. Up to the age of puberty, only the lighter exercises are to be allowed. The list of Olympic Victors shows that the same person has very rarely been successful both in the contests of boys and in those of men, and this is a clear indication that severe training is bad for young boys. The time for severe gymnastic training does not begin till three years after puberty, and this three years' interval is to be devoted to the "other subjects." It is to be noted here that Aristotle differs from Plato in keeping gymnastic training more sharply separated from other subjects, which only find a place between the two periods of gymnastic training. He held that it was impossible to exert the mind and the body at the same time. Plato's rule was, on the contrary, "never to move the mind without the body or the body without the mind," and he begins the "other subjects" at the age of 10. He also assumes that mathematics will be begun at the age of 18, when Aristotle's pupil would be starting on his gymnastic training and unable to attend to anything else. In both Plato and Aristotle we note that a far sharper line is drawn between adolescence and early manhood than with us, and that although adolescence was presumably earlier with the Greeks than among us. There is little doubt that the prolongation of boyhood to an age when most of our pupils have to be earning their living was the secret of the physical perfection to which the Greeks attained, and Aristotle is a great deal more conservative in this matter than Plato.

We have seen that music has no obvious practical utility, but its end is not merely pleasure, either. It is pleasant, of course, and may therefore be used for purposes of relaxation, but that is not its function in a scheme of education. Again, if we consider what is the highest function of music, we see that it is to furnish a means of employing leisure nobly (*σχολή, διαγωγή*). The end of life is not work or business; for we are busy, as nature teaches us, only in order that we may attain to leisure, and then our occupation should be with something that has value in itself and not merely as a means to something else. But this is not the educational function of music, either; for the young are not concerned with the noble use of leisure, and it is not even necessary for them to learn music as a preparation for it. They might learn to play later in life; or, so far as the noble use of leisure goes, they might content themselves with listening to professional performances, which will necessarily be better than their own. There is a third function of music, the "purgative," when it is used to effect a discharge of overwrought feelings of pity and fear, but that cannot be its educational function, either. Music can only be justified here in so far as it contributes to the training of character, and we do find music presents in a higher degree than anything else direct likenesses of different types of feeling and character. In this sense, it is more directly imitative than painting or sculpture, which only express differences of character in an indistinct manner. It is therefore by learning to take pleasure in the right kinds of music that the young can most easily be led to take pleasure in right feelings and good characters, and to feel pain at the opposite.

To a modern, this is the most difficult part of the Greek theory of education to appreciate;

but it is no peculiar theory of Aristotle's, but common to all Greek writers. They hardly ever mention the art of sculpture at all, though we are accustomed to think of that as the art in which they excelled. Painting is referred to rather more frequently, but the typical art is always music. And yet Greek music was hardly what we should call by that name at all. Harmony was unknown, and the melodies were most primitive. On the other hand, the rhythms were much more complicated than ours; and, above all, the Greeks had an elaborate system of "modes" or scales differing in pitch and position. It was in these that they chiefly felt the power of music to imitate feelings and character; and, if we think of the difference in feeling which we still recognize in major and minor scales, we may partly understand what they meant.

Aristotle holds, then, that the young must be accustomed to scales which express good character, and he criticises Plato for allowing the use of the orgiastic Phrygian mode in education. It is of the utmost importance that our pupils should be taught to play upon the lyre, and, above all, to tune it in the proper key. The educational effect upon the character is thus much strengthened; and besides, it is really impossible to distinguish good and bad music without being able to play a little. We must remember, however, that we do not wish to train professional musicians any more than professional athletes. Professional excellence in anything is always one-sided and therefore fatal to a harmonious education of mind and body.

At this point Aristotle's scheme of education comes abruptly to an end. Even his discussion of music is incomplete; for he has not yet discussed either rhythm or words, under which last head he must have treated everything that we call literature. The *Poetics* does not help us; for that is a practical course of lectures intended to teach older people how to write tragedies, and has nothing to do with education. As Mr. Newman puts it, "Our latest glimpse of the youthful object of Aristotle's care is obtained at the moment when, at the age of 19 or thereabouts, he is committed for the first time to the tender mercies of the sterner form of gymnastics, and left we do not exactly know for what period, but probably till the age of 21, in the hands of the gymnastic trainer." Either the *Politics* was never finished, or the end of it has been lost. What is still more serious is that we know nothing at all of Aristotle's scheme for the training of the intellect, which could not have failed to be interesting, and would probably have been more independent of Plato than his plan for the training of character. It is probable that other sciences than the mathematical would play some part, and that Aristotle would make more of literary and historical studies than Plato did. It is certain that he would have championed the cause of science as an end in itself in a far more exclusive spirit. His ideal seems to have been that of a well-ordered state, in which a few choice spirits were set apart for purely scientific work, and did not have to trouble themselves about practical matters. This would never have contented Plato. His ideal of science was at least as high, but he held that those who had contemplated the Good must "descend into the Cave in their turn" for the service of humanity. Aristotle's sharp separation between theoretical and practical wisdom enabled him to dispense with this necessity.

It can hardly be said that Aristotle's educational views have had any influence upon pedagogic theory till quite recently. The school which he founded devoted itself more and more to historical research, and soon ceased to be otherwise important. Nor had his theories any importance in the Middle Ages. There was indeed a Latin version of the *Politics* as early as the thirteenth century, and it had considerable influence upon contemporary political thought; but we look in vain for traces of its educational teaching. The medieval scheme of education was Greek, but not Aristotelian, in its origin. It goes back through the Neo-Platonists to Plato himself, and through him to the Pythagoreans, and it was already fixed on traditional lines before the revival of Aristotelian study. In modern times the *Politics* has chiefly served as the channel through which the more mature ideas of Plato on education have become known; for the *Laws* are comparatively little read. The real bearing of Aristotle's discussions can only be fully seized, however, by reading them in the light of his master's teaching. J. B.

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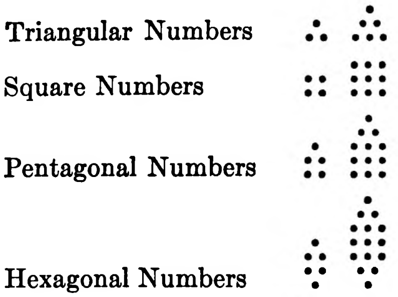
ARITHMETIC. — History. — Arithmetic is the oldest of all sciences, and for commercial purposes at least it was well developed in the earliest historic period of which we have any exact information. In the cuneiform inscriptions of Babylon, for example, tables of squares and cubes, written on a decimal-sexagesimal system, are extant that date back to about 2000 B.C., — the Senkereh tablets in the British Museum discovered in 1854. More recently Hilprecht has deciphered numerous tablets from Nippur that are probably somewhat older, and that show a very advanced system of multiplication and division tables, certain multiplicands reaching nearly to 200,000. It was perhaps about the time that the clay tablets containing these tables were prepared that the original papyrus was written from which the Egyptian scribe Ahmes (*q.v.*) copied his work. In this copy of about 1700 B.C. an advanced state of arithmetic is set forth. We have, however, earlier evidence than either the cuneiform inscriptions or the papyrus, since a piece of pottery on which some numerals are written and which dates from the first dynasty of Egypt has recently been brought to light. We may therefore be assured that the science was quite well developed in the earliest historic times.

The definite history of the subject assumes satisfactory form when we reach the Greek civilization. Here it first appears in the form of practical calculation, or λογιστική (logistic) as the Greeks called it, from λόγος (calculation, reason, speech). From this term the auditors of accounts in Athens were called λογισταί. The theory of numbers was clearly distinguished from logistic and was called ἀριθμητική (arithmetic), from ἀριθμός (number). Logistic was taught to those going into trade, as the use of the swanpan (see ABACUS) is taught in China to-day, but was not considered part of a liberal education. We have no ancient treatise extant on the Greek logistic, although we are familiar with some of the methods of computation through certain works on metrics.

The ἀριθμητική is, however, well known to us. It formed, with geometry, all that was known of pure mathematics in the philosophic schools of Greece. It first appeared in a large way in the school of Pythagoras (*q.v.*), in the sixth century B.C., and was very likely brought by him from Babylon and Egypt. He based his philosophy on the postulate that number is the cause of the varied qualities of matter, and thus the scientific study of number became a necessary introduction to his subtler theories, even as geometry was to Plato's. Humfrey Baker was correct in spirit, although historically at fault, when he wrote in *The Wellspring of Sciences* (1568), "The noble philosopher Pithagoras who caused this inscription to be written (vpon his schoole doore where hee taught philosophy) in greate letters, *Nemo Arithmeticae ignarus hic ingrediatur:* Let none enter heere, that is ignorant in Arithmetike," a paraphrase of Plato's well-known statement concerning geometry. Pythagoras, or at any rate his followers, considered 5 the cause of color, 6 of cold, 7 of mind and health and light, 8 of love and friendship and invention, and so on. Earth was held to be the product of the cube, fire of the pyramid, air of the octahedron, water of the icosahedron, and the universe of the dodecahedron, and this fanciful theory was connected with arithmetic through polygonal and solid numbers. Thus there was not only the square number, but also the triangular, pentagonal, and so on.



In the same way there were not only cube numbers, but also pyramidal, parallelopipedal, etc. Much interest attached to odd numbers, and in particular to primes, these being more difficult to manipulate. The primes below 10 were those that appealed most to the popular knowledge, whence, excluding 2 as an even number, 3, 5, and 7 were held in the highest esteem. Of these, 5 was half of the common radix, 10, and hence in general was not so mysterious, although the Pythagoreans made much of it. Three and 7 were therefore the objects of popular superstitious respect in ancient days, and the tradition has maintained its place as the race has developed.

The greatest writer on arithmetic among the Greeks was Nicomachus (*q.v.*), who flourished about 100 A.D. He endeavoured to do for this science what Euclid had done for geometry and he accordingly embodied in his treatise the arithmetical lore that had accumulated in Greece for several centuries. The effort was not successful, save as it preserved much of the early theory of numbers, and with this work the Greek contributions to the science practically close, the Arithmetic of Diophantus (*q.v.*) being more strictly speaking an algebra.

The chief contribution of the East to arithmetic was the numerals (*q.v.*). The various treatises of India (see ARYABHATTA, BHASKARA) show that the principal applications in that country, between 500 A.D. and 1200 A.D. were interest, measurements, inheritance problems, alligation, and rule of three.

The most important single work of the early Arab supremacy is the arithmetic of al-Khowarazmi (*q.v.*), written about 830 A.D., and setting forth the importance of the Hindu numeral system. Among the Arabs, as among the Hindus, the operations were performed in a more primitive manner than at present (see ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, ABACUS), but the general principles were those in use to-day.

In the Middle Ages in Europe arithmetic maintained its ancient division into practical calculation and the theory of numbers, the latter entering into the courses in the universities. The Church schools were interested largely in computations relating to the calendar. (See COMPUTUS, CALENDAR.)

The first printed arithmetic appeared at Treviso, near Venice, in 1478. The first similar publication appeared in Germany at Bamberg in 1482, in England at London in 1522, and in France at Paris in 1495. There were earlier printed works, however, that contained a little work upon the subject. For example, Caxton published an anonymous work in London in 1480, entitled *The Mirrour of the World or Thymage of the Same*, containing a chapter beginning with the words, "And after of Arsmetrike and whereof it proceedith." The first arithmetic printed in America appeared in the City of Mexico in 1556, — *Sumario cōpēdioso de las quētas de plata y oro . . . con algunas reglas tocantes al Aritmética. Fecho por Juan Diez freile*. The first arithmetics in the English language are probably lost, but the first one of note was Robert Recorde's *The Grovnd of Artes*, of which no copy of the first edition is extant. It appeared between 1540 and 1542, and ran through many editions. The first arithmetic published in the English language in America was a reprint of Hodder's work which appeared in Boston in 1719. The first one by an American author was Isaac Greenwood's book, published at Boston in 1729.

The chapters of elementary arithmetic at first showed a combination of the Greek theory of numbers and the art of calculating. Thus there was more or less treatment of prime numbers and of amicable, deficient, and redundant numbers, as well as of square and cube roots and proportion, all these originally belonging to the theory of numbers. Along with these came an extensive treatment of the greatest common divisor, needed in the Middle Ages when large common fractions had not been replaced by decimals (see FRACTIONS), together with such semi-practical subjects as alligation (a kind of substitute for indeterminate equations), rule of three (a non-theoretical proportion), the chain rule, and other topics now superseded by more modern ones. Gradually the commercial features have replaced the theoretical ones, until at present elementary arithmetic pretends, at least, to be a practical subject.

General Nature as now Conceived. — As has been stated under the history of arithmetic, the present tendency in America, and largely in other countries, is to consider arithmetic as a practical subject that is necessary in the life of every citizen, man or woman. It is not denied, save by a few, that arithmetic has a culture value that is mingled with its utilitarian value, although, like the culture of letters, of art, and of science in general, its exact bounds could not be marked out even if it were desirable to do so. That the form of reasoning of mathematics, the habit of accuracy, and the contact with exact truth found in the study of arithmetic affect the pupil favorably in his other work would hardly be questioned by any fair-minded person. It is the present feeling, however, that these features of training can all be secured from the study of genuine, modern, commercial problems, better than from obsolete business forms and better than from mere puzzles. The best textbook-makers at the present time, therefore, are attempting to balance fairly the abstract drill work with such concrete problems as shall show the real applications of arithmetic to the daily life surrounding the pupil.

The History of Teaching. — As stated in the section on the history of arithmetic, the subject was taught in early times under two distinct aspects. In the preparation of the merchant and those who had to do with land measure and building, arithmetic was taught purely from the side of calculation, the abacus (*q.v.*) playing an important part in most countries. This phase of the subject was often left to slaves, to those who prepared apprentices, and later to schools of arithmetic (*Rechenschulen*). The science of numbers was taught in such schools of philosophy as those of Pythagoras and Plato, in such early universities as that at Alexandria, and in the medieval universities of Europe.

It was not until printed books appeared that an effort was made to unite these two phases. One result of printing was to spread abroad a knowledge of the superiority of the Arabic numerals over the Roman, and this led to the abandoning of the abacus. The effect on the teaching of arithmetic was not fortunate in one respect, since the giving up of the counters led from the concrete, visual, palpable arithmetic to the abstract arithmetic of figures. Counting and reckoning came to be more matters of words and abstract rules than before, and arithmetic was probably more poorly taught than it was under the abacus system.

To break away from this method of the mere rule, efforts began to be made in the seventeenth century, and, in a more pronounced way, early in the eighteenth century, notably in the Francke (*q.v.*) institute at Halle. These efforts were in the direction of making the number concept more real and the applications of number more genuine. Thus in the Braunschweig-Lüneburg school decree of 1737 there are directions for beginning number work by counting the fingers, apples, and other objects, and for basing the multiplication table upon addition. Christian Wolf (*q.v.*) (1728) insisted upon getting at the foundation principles of number by questions as to the child's reasons for proceeding; Christian von Clausberg (1732) urged that a clear understanding should accompany each rule; and Basedow (*q.v.*) (1763) emphasized the danger of having the child feel that he proceeded merely on the authority of his teacher. It was in the *Philanthropin* at Dessau, however, that serious attempts at reform were first made in any noteworthy fashion. The leader in this phase of the work of the Philanthropinists was Christian Trapp (1777). He advocated teaching the fundamental operations with nuts and other objects before the figures were learned, a feature emphasized by Pestalozzi a little later. Trapp was succeeded by Gottlieb Busse (1779), who wrote extensively upon primary arithmetic, and who introduced the so-called number pictures by which he brought to the child's senses a group of dots along with the figure, a scheme that is still found helpful in all schools. Much credit is also due to Freiherr von Rochow of Rekahn (*q.v.*) near Brandenburg, and his associates, who about this time sought to free elementary arithmetic from the mere demands of mechanical business and raise it to the plane of a culture subject in the best sense. Mention should also be made of the work of Peter Villaume of Halberstadt (1779), who insisted that arithmetic "is a practical logic," and based all of his work with numbers upon perception, and brought oral arithmetic forward as more worthy of attention. In this movement there also joined Bernard Overberg (*q.v.*) of Münster (1793), A. H. Niemeyer (*q.v.*) (1802), and G. F. Dinter (*q.v.*) (1806), and each was influential in preparing the way for Pestalozzi (*q.v.*). It is to the latter (1803) that we owe the greatest impetus in the rational teaching of arithmetic to young children. The essential features of his reform are as follows: (1) He taught arithmetic to children as soon as they entered school, basing his work on perception. (2) He insisted upon a knowledge of number and the simplest operations, using objects, before the figures were taught. (3) He approached the subject of fractions in the same way. (4) He made arithmetic the most prominent subject in the school, and it is to his influence that its present prominence is due. (5) He emphasized oral arithmetic, a movement that led to the great success of Warren Colburn (*q.v.*) in the United States. The next noteworthy name is that of Tillich (*q.v.*) (1806), who attempted to improve upon Pestalozzi by a systematic use of material, inventing for this purpose a set of prismatic blocks of different lengths so arranged as to make prominent the decimal feature of our number system. The plan failed, as all such narrow plans do, and from the time of Tillich to the present there have been innumerable illustrations of this law. An enthusiastic teacher finds some device; he exalts it to a "method"; it succeeds because of his enthusiasm; it proceeds fairly well in the hands of his pupils, and then it is forgotten save for some little feature that becomes impressed upon the permanent educational body. Of these semi-forgotten methods a few may be mentioned. Türk (1816) did not wish arithmetic in what we call the first grade, nor before the child reached the age of 10 years, and of this idea there is just at present a temporary revival as if it were a new discovery, although it was practically universal before Pestalozzi. Kawerau (1816) made formal culture the great aim in teaching, and his extreme views provoked a reaction that is perhaps reaching its climax at the present time. Krancke (1819) suggested the concentric circle plan, keeping the child in the number space 1–10 until that was mastered, in spite of the fact that a child's interest in and need for counting runs far beyond his work in the operations at every step in his progress. Grube (1842) carried Krancke's plan to an extreme, but had at least the merit of thoroughness. He used objective illustration more extensively than any one would advocate at present, and attempted the impossible task of having a pupil master each number before proceeding to the next. Knilling (1897) and Tanck (1884) carry to an extreme the plan of building all number work upon counting.

The arrangement of matter in the textbook has occupied the attention of writers for the past half century. There are two plans, more or less connected. The first and oldest is the topical arrangement, the one that was followed for thousands of years in the teaching of arithmetic. This has the advantage of a thorough treatment of each topic as it is met, thereafter not returning to it. The other is the "spiral method," first brought into prominence by Ruhsam in 1866. It has the advantage of returning to each topic, each time with a higher treatment. Neither plan has proved successful in its extreme form, as might have been expected. The spiral plan has had to give way to a topical plan within a period of one year or two years, thereafter again reviewing some or all topics. This has given rise to the favorite three-book series in the American schools of to-day. The extreme spiral plan resulted in scraps of information and lack of continuity and a falling off in interest from want of a feeling of mastery. At present, in the United States, the tendency is to merge the two plans, preserving the strength of the topical arrangement within each half year, each year, or within some longer period, reviewing systematically and on a higher plan, one or more times according to the subject, all of the important topics of arithmetic.

Present Status in the Curriculum. — Placed in a position of preëminence by Pestalozzi, arithmetic has for a century been looked upon as the most important subject in the curriculum. In spite of all the attacks made by modern subjects that call for their share in the course, it has maintained its position even to the present time. One reason for this is its definiteness; it has an exact, well-arranged body of material, and it has proved its usability. Other subjects, like handwork and nature study, however, have not yet developed in such way as to present definite reasons for being, or a definite, well-arranged sequence of topics. For this reason arithmetic will probably maintain a prominent place for a long time to come.

It is not, however, to be expected that it should keep the position it once held. There is no reason why it should take the time that it does, if other well-defined subjects appear that can justify their inclusion in the curriculum. The actual business part of arithmetic can easily be taught in less time than is now given to the subject, and arithmetic must surrender a portion of the time it occupies as soon as these other topics are sufficiently ordered and thought out to justly claim a share.

At present arithmetic is commonly taught in the schools of the United States during the first eight school years. There is some attempt to return to the pre-Pestalozzian view, advocated also by Türk, of omitting it from the first school year, but it is a doctrinaire idea that is not taken very seriously. There is also an attempt to merge algebra and arithmetic in the eighth, or the seventh and eighth, school years, and this seems likely to succeed, in spite of the efforts of some writers to make the algebra rather useless. There is no reason why algebraic notation should not come to the help of arithmetic and mensuration in the seventh school year, but there is a good reason why algebra should not replace arithmetic at this time. The pupil in his seventh school year begins to appreciate the larger problems of business, and they must be taught here if ever. Some arithmetic must therefore be retained in these years, and particularly the commercial part and mensuration, and so far as algebra can throw light upon these subjects it should be employed.

There is, in American schools, a further study of arithmetic in commercial classes in the high school, where questions of banking, investments, bookkeeping, commissions, and the like are better understood.

In European countries the movement to improve the curriculum is progressing most satisfactorily, especially in Germany. There the obsolete part of arithmetic has been rather completely eradicated. Algebra is joined to arithmetic from the sixth school year, the word "arithmetic" including our elements of algebra. In general, more of an attempt is made to carry arithmetic, algebra, and geometry simultaneously in the sixth, seventh, and eighth school years, than in our common schools. This is a little more apparent than real, however, since we are now, in schools like those of New York City, improving the mensuration to a point where it may rank with the early geometry of Germany, and are adding algebra to the curriculum. In France the arithmetic seems more theoretical than necessary, but, as in all Continental countries, a year is gained over the English and American schools by the use of the metric system. In England the arithmetic seems in process of slow improvement, although a great deal of obsolete matter is found in the textbooks. The far-reaching examination system in that country seems responsible for the retention of much useless matter. If the principle were accepted that the mental discipline of arithmetic can come from a modern problem, representing real conditions, as well as from an obsolete one, it would seem that the English textbooks might be improved without loss of that thoroughness which is such a commendable and characteristic feature.

D. E. S.

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ARITHMETIC, HYGIENE OF. — The hygiene of instruction in its positive aim of developing habits of healthful activity scrutinizes all the processes of learning and all methods of instruction from the point of view of healthful development. Even in a subject like arithmetic, which represents *par excellence* an intellectual branch of instruction, the demands of hygiene are important.

In the first place arithmetic is of ancient origin, and from its history an undue importance has often been assigned to it. A feeling of the transcendent importance of this subject has prevailed in modern times even among everyday people as well as among philosophers. In the minds of many both instinctive and practical interests are associated with it. Hence it has come to pass that in the history of the schools an undue amount of time and attention have been devoted to the subject; and a considerable ballast of unessential or extraneous material has crept into the textbooks. To-day in many urban schools probably from one sixth to one fifth of the total time in the classroom is devoted to this subject, and in the rural schools probably often considerably more. Besides this, pupils are very apt to spend considerable time in home study in arithmetic. Recently voices have been raised against exaggerated views of its value. According to Sir William Hamilton, mathematics is not useful for training the powers of observation, nor for cultivating the reasoning power; so that even the traditional significance of the subject is questioned by competent authorities. As an instrument of mental culture mathematics can pretend to but a single benefit. This study "if pursued in moderation, and if efficiently counteracted, may be beneficial in the correction of a certain vice and in the formation of its corresponding virtue. The vice is the habit of mental distraction; the virtue, the habit of continuous attention." This beneficial effect of mathematics in training attention is recognized by hygiene and strongly commended. The exaggerated ideas of the efficacy of arithmetic in the cultivation of the mind and the resulting over-pressure and premature training are strongly condemned by hygiene. With the many subjects that always crowd the curriculum, the question whether too much time is not spent on arithmetic and whether improper material is not often presented, although primarily pedagogical, becomes hygienic also.

Again, certain individuals seem to have little ability for work in mathematics, and others seem to be in special danger of nervous overstrain from work in this subject. An English physician, Dr. Sturgis, has studied chorea in children, and many of these cases he has found due, as he thinks, to causes connected with the school work, and arithmetic he deems an especial factor in producing the disorder. In case of a nervous child he maintains that working sums is liable to cause chorea. In the case of some children, as pointed out by General Walker, work in arithmetic is a frequent cause of worry and interference with sleep. When children do sums in their dreams, this is a danger signal. All such obvious causes of injury to health are condemned by hygiene, but it demands special attention to some less obvious but more general results of certain methods of instruction.

Pedagogy is concerned with the direct results of instruction. But besides the primary results of instruction in any subject, there are, as has been pointed out by Dr. Baade, certain secondary effects of instruction, certain by-products, to use the language of industry, which are often of great importance. In arithmetic there is a good opportunity to study the latter. Certain habits of interference of association, certain arrests, as they have been called by Dr. Triplett, illustrate very well these secondary effects of certain methods and processes of learning.

Number forms sometimes illustrate the secondary effects of instruction. Such habits represent not only so much mental ballast, but usually also interference of association and often the germs of pathological neuroses. They are probably pretty common. The counting habit, *arithmomania*, so-called, is likely to have several representatives in each class, according to Triplett's investigations. This is a real handicap, filling the mind with quantitative ideas to the exclusion of causal relations.

Hygiene is especially concerned with the problem of the age when work in arithmetic should be begun. In order to answer this question it is necessary to consider briefly the mental operations involved in arithmetical work. In the simpler study of number and number relations, in addition, subtraction, and the rest, the process of learning is chiefly one of acquiring habitual associations. What hygiene demands here is that these should be formed naturally and that interference of association or mental confusion shall be avoided.

Again, in teaching arithmetic to very young children all sorts of objective methods and devices have been developed, and these are deemed necessary in such instruction. Still further, it appears that the number forms and the like which are common in adults are developed in the early years of instruction. From these are likely to develop artificial and grotesque habits of thought, as illustrated by Dr. Triplett's so-called arrests and by some of the number forms.

The problem of the proper age for beginning arithmetic is then something like this. At what age can a child be drilled in arithmetical processes without the aid of artificial devices and the like which are likely to persist as arrests or habits of interference of association; and at what age should the study of logic be begun; at what age does the child have a nascent interest for arithmetical work? We have at present no adequate data for answering these questions, but until further investigations have been made the verdict of hygiene is that ordinarily formal instruction in arithmetic should be postponed until at least the age of 8 or 10. The Italian physiologist, Mosso, President G. Stanley Hall, Professor Patrick, and others agree in condemning formal instruction in this subject before this age. "Mathematics in every form," writes Professor Patrick, "is a subject conspicuously ill-fitted to the child mind. It deals not with real things, but with abstractions. When referred to concrete objects, it concerns not the objects themselves, but their relations to each other. It involves comparison, analysis, abstraction. . . . The grotesque number forms which so many children have, and which originate in this period, are evidence of the necessity which the child feels of giving some kind of bodily shape to these abstractions which he is compelled to study."

The practical teachings of the hygiene of instruction as regards arithmetic may be summed up in the light of our present knowledge somewhat as follows: the formal instruction in this subject should not be begun before the age of 8 or 10. Arithmetical work before this should be spontaneous activity on the part of the child. By postponing arithmetic until this age, it is possible to do away for the most part with artificial devices and methods which may lead to arrests or interference of association later on. The work in arithmetic should be simple, and the complex examples in logic and the like should be eliminated. In the case of nervous children special care should be taken to avoid worry and the development of neuroses like chorea. And, in general, special attention should be given in this subject to the secondary effects which are important from the point of view of mental hygiene. W. H. B.

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ARITHMETIC IN VERSE. — See Versification as a Method of Teaching.

ARITHMETIC, PSYCHOLOGY OF. — See Number, Psychology of.

ARITHMETIC SCHOOLS. — See Writing and Arithmetic Schools.

ARIZONA, TERRITORY OF. — Organized as a territory by Congress in 1863 from lands formerly a part of New Mexico, and an enabling act for its admission as a state has been before Congress for the last two years. It is located in the Western Division, and has a land area of 112,920 square miles. In size it is about as large as New England, New York, and New Jersey combined. For administrative purposes the state is divided into 13 counties, and these in turn into school districts. In 1900 Arizona had a population of 122,931, and a density of population of only 1.1 persons per square mile. Its estimated population in 1910 was 157,619.

Educational History. — The first record of an appropriation for public school purposes is found in the proceedings of the first Legislative Assembly, which met at Prescott in 1864, and appropriated out of the treasury a sum of $250 to each of the towns of Prescott, La Paz, and Mojave, for a public school, conditional on the towns raising the same amount; and $500 to Tucson, conditional on the town maintaining a school taught in the English language. No further legislation was enacted until 1868, and any schools in existence during that interval must have been maintained by private means. In 1868 the first school law was enacted, and a system of free schools was provided for, but, as no tax was required to be levied, no schools were opened. The report of the Governor in 1870 stated that there was not a public school in the territory. In 1871 a new school law was enacted, and the outlines of the present school system were laid down. The law of 1871 provided for a system of public instruction patterned after the California law of 1866. The Governor was made *ex officio* Superintendent of Public Instruction, the Probate Judges were to act as *ex officio* County Superintendents, and the Governor appointed County Examiners to assist the judges in examinations. Governor Safford was deeply interested in education, and seems to have done much to urge the people to found schools. The first school under the new law was opened in Tucson in March, 1871, and by 1880 about one half of the school population was enrolled in the schools. In 1872 the first public school for girls was opened in Tucson. In 1875 the question of aid to private and sectarian schools was definitely settled. In 1873, 1875, 1879, 1881, and 1883, revisions of the school law were enacted. In 1879 the separate office of Superintendent of Public Instruction was established. In 1883 a Territorial School Fund was created, and the law of 1879 was much enlarged. In 1885 the present law was substituted for what existed before. This law has been amended in minor particulars and a number of additions have been made to it, but the main outlines, adapted in large part from the California law, have remained unchanged to the present time.

The year 1885 may be fixed upon as the date of the establishment of the present school system. The Legislature of that year also rounded out the school system by establishing a normal school at Tempe, and the state university at Tucson. In 1881 a uniform series of textbooks for the schools of the state was provided for, and in 1885 the State Board of Education issued a uniform state course of study. No records exist showing the condition of the schools prior to 1885. In that year there were 137 schools in the territory, maintaining an average of 120 days, with an average daily attendance of 3,226 children, and at a total expense of $138,164. Schools and attendance have increased five times since 1885, and expenses six times. In 1892 a State Teachers' Association was organized; in 1895 a Union High School law was passed; in 1899 the Northern Arizona Normal School was established at Flagstaff; manual training was authorized in 1905; and the consolidation of schools was authorized in 1907.

Present School System. At the head of the system is a Superintendent of Public Instruction, a Board of Education, and a Board of Examiners. The Superintendent of Public instruction receives a salary of $2000 a year; has general oversight of the schools of the state; apportions all school money to the counties; prepares all blank forms used; and makes a biennial report to the Governor on the condition of the schools. The Board of Education, consisting of the Governor, Treasurer, Superintendent of Public Instruction, Principals of the Normal Schools, President of the University of Arizona, and two school men appointed by the Governor, adopts rules and regulations for the schools; prescribes and enforces the use of a uniform series of textbooks, and a uniform course of study for the schools; adopts a list of books for school libraries; issues educational and life diplomas; and revokes any diploma or certificate for cause. The Board of Examiners, which consists of the Superintendent of Public Instruction and two persons appointed by him, adopts rules and regulations concerning examinations; prepares all questions and grades all papers; issues and revokes certificates to teach; and recommends candidates for life and educational diplomas.

For each county there is a County School Superintendent, who apportions the school money to the districts; approves all bills for all purposes, and draws his warrant for their payment; conducts the teachers' examinations for the Board of Examiners, and forwards all papers to them for grading; appoints district trustees and fills all vacancies; conducts an annual county teachers' institute; visits, examines, and has general oversight over the schools of his county.

For each school district there is a board of 3 School Trustees, one elected each year by the people, and holding office for 3-year terms. It is their duty to enforce the rules, regulations, and laws; to manage and care for the school property; to provide furniture and supplies; to rent, build, or repair schoolhouses as directed; to employ teachers and other employees and fix their compensation; to employ a supervising principal if the district contains 1000 or more census children; to admit and exclude pupils; to see that an annual school census is taken; to call district meetings in emergencies or on petition; to call an election to vote a special tax for additional school facilities, or bonds for a new schoolhouse; and to make reports to the County Superintendent or the Superintendent of Public Instruction.

School Support. — Arizona originally received the 16th and 36th section of land for schools, which were set aside by Act of Congress in 1861. These amounted to 4,050,347 acres. The enabling act for the admission of Arizona as a state provides for the further grant of sections 2 and 32 in each township, which would double the grant for schools. Three million acres of land are also appropriated to pay the debts of the territory and of the counties, with a provision that any surplus shall be added to the common school fund. The act also provides for a minimum sale price of $3, $5, and $25 per acre, according to location.

Much of this land is, as yet, of little value. A general tax of 3 cents on each $100 of property, together with the interest on the permanent fund, is apportioned to the counties on the basis of the school census, 6–21 years of age. In each county, poll taxes and fines go to the county school fund, which is further augmented by a county school tax of not less than 50 cents nor more than 90 cents on each $100. All state and county money is now added together, and is apportioned to the different districts by the County Superintendent in the following manner: —

To districts having 10 to 20 census children, $500; to districts having 20 or more census children, $600; and to all districts having had an average daily attendance of over 25 during the preceding year, $25 per pupil for such excess. The money which remains is to be apportioned among the districts which have shown, for 5 months, an increase in the average daily attendance over that of the preceding year. Any special district taxation, as well as all fines collected for the violation of local ordinances, go to the district where collected. Most of the county districts levy no local tax. The Arizona apportionment plan is better even than that in California, good as is the latter, and, like California, it insures a good school and a good teacher for every district in the state. Of the total school revenue, 16.02 per cent comes from permanent funds and rents, 20.09 per cent from state taxation, 57.94 per cent from local taxation, and 5.95 per cent from miscellaneous sources.

The total expenditure for schools, during the last year for which reports are available, was $767,031. This was equal to an expenditure of $5.09 per capita of the total population, as against $4.27 for the U. S. as a whole. The average expenditure per pupil per day in average daily attendance was 33.64 cents, as against 19.8 cents for the U. S. as a whole, and 27.3 cents for the Western Division. North Dakota, Montana, and Nevada alone spent more. The total yearly expenditure per pupil in average daily attendance was $45.31, an amount exceeded by only 2 Eastern and 5 Western states. Each adult male needs to contribute but 72 cents to produce $1 for each child 5 to 18 years of age in the state, as against $1.02 for the U. S. as a whole. These figures show a high per pupil expenditure on a low per capita cost. This is due in part to the large per capita wealth of Arizona, and in part to the large excess of adult males. Arizona has made very rapid progress in expenditures within recent years, and every item of school expense has increased much more rapidly than has the population. During the past six years, the expenditures have almost doubled, while the school census has increased scarcely 40 per cent.

Educational Conditions. — Of the population of 1900, 17.9 per cent were foreign born, and of this number 59 per cent were Mexicans. Classified by race, 75.6 per cent were white; 11.5 per cent were Indians; 1.5 per cent were Negroes; and 1.4 per cent were Mongolians. By sex, 58.4 per cent were men; and 25.9 per cent were between the ages of 5 and 18 years. Of the total population of 1900, 84.1 per cent lived in country districts, and the state had no city at that time with as many as 8000 inhabitants. Mining and agriculture are the chief resources of the state. Large areas are practically uninhabited. In illiteracy, according to the census of 1900, 14.9 per cent of the white population 10 years of age or over, and 29 per cent of the total population, were illiterate. The large percentage of illiteracy among the native whites is due to the presence of so many Mexicans, and in the total population to the presence of so many Mexicans and Indians.

The average length of term provided in Arizona was 135 days, as against 163.3 days in the Western Division, and 154.1 days for the U. S. as a whole. Of the school population, 5–18 years of age, 65.59 per cent were enrolled in the schools, as against 69.61 per cent for the U. S. as a whole. Of the number enrolled, but 62.64 per cent were in daily attendance, as against 71.24 per cent for the U. S., and 73.22 per cent for the Western Division. This equaled an average daily attendance of but 58.8 days per year for each child 5–18 years of age, and 84.6 days for each child enrolled, as against 76.1 days on census, and 109.8 days on enrollment for the U. S., and 109.3 days on census, and 119.6 days on enrollment for the Western Division. The large number of Mexican and Indian children explain these low percentages.

The compulsory attendance law requires the attendance of all children between 8 and 14 years at the public schools for a period of 6 months each year, unless excused for certain statutory reasons, and lists of children not in attendance must be furnished to the sheriffs, constables, or city marshals of the respective school subdivisions, whose duty it is to locate, inquire into, and, if necessary, prosecute such cases. Employers are forbidden to employ such children, and attendance cards must be kept on file and open to inspection for all children. It is difficult to enforce such a law, because of the sparse population. A sheriff with a county as large as Massachusetts can do little, and the percentages for attendance would indicate that the law is not enforced.

The average value of the school buildings in use has increased rapidly in recent years, and reached $3835 by 1907. The schools are nearly all small, there being but 15 schools in the state in 1906 that employed as many as 8 teachers, and but 5 schools that employed as many as 15 teachers. The schools are graded, and are relatively well taught, the apportionment plan in use enabling every school in Arizona to secure a good teacher. In addition to the regular elementary school studies, manual training and domestic science are authorized for all schools having a school census of 200 or over, though the last available report shows that but one city has so far provided such instruction.

Teachers and Training. — Arizona employed 645 teachers during the last year for which reports are available, of whom 109 were men and 536 were women. The average monthly salary was $99.50 for men, and $75.06 for women, with a school term of 6¾ months. The certification standards are much higher than those to be found in many Eastern or Mississippi Valley states. Two state certificates are issued by a central examination board, both of which are valid in any county. In 1908, 51 per cent of the teachers held the highest grade certificate. Graduates of colleges in any state may be certificated on credentials, and the holders of life diplomas from any state or of diplomas of graduation from any state normal school are certificated without examination. In this matter of interstate recognition of credentials, Arizona is more liberal than any state in the Union. Arizona maintains two normal schools for the training of elementary teachers, one at Tempe and one at Flagstaff, though the number of graduates from the two schools combined has, for some years, been exceeded from two to three times by the number of normal graduates coming into the state from other states.

Secondary Education. The first high school in Arizona was organized in 1895, under the provisions of an act permitting any district, or any union of adjoining districts, having a school census of 1000 or over, to unite and form a high school district. Owing to the small population, high school development has of necessity been slow. The second school was formed in 1901; a third in 1903; in 1905 the number rose to 5; and in 1908 to 8. There are but two private high schools in Arizona, both of which are small. Like California, Arizona has wisely reserved the state fund and all state and county taxes for elementary schools only, so that the high schools are supported wholly by separate taxation. At present this is in the form of a tax on the districts maintaining them, there being as yet no state aid.

Higher and Special Education. The University of Arizona, opened in 1891, is the only institution for higher education in the state. Arizona maintains an industrial (reform) school at Benson for both sexes, and also appropriates money to care for its deaf, dumb, and blind in institutions in other states. There are no professional schools in the state apart from the University of Arizona and the two state normal schools at Tempe and Flagstaff. The enabling act for the admission of Arizona as a state, however, provides for the grant to the state of 120,000 acres of land for the state university; for asylums for the deaf, blind, and dumb, 100,000 acres; for normal schools, 200,000 acres; for agricultural and mechanical colleges, 150,000 acres; for a school of mines, 150,000 acres. E. P. C.

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ARIZONA, UNIVERSITY OF, TUCSON, ARIZ. — A coeducational institution for higher education maintained by the territory as part of the system of public education. It was organized in 1885 in accordance with the requirements of the Morrill Act of 1862. The statutes were revised in 1901, and the government of the university was placed in the hands of a Board of Regents consisting of the Governor and Superintendent of Public Instruction, *ex officio*, and 4 members appointed by the Governor for 4-year terms. The university consists of the college of agriculture and mechanical arts, the school of mines, the agricultural experiment station, and the preparatory department; a normal department is authorized by statute, but has not yet been established. The preparatory department is a manual training high school with a 4 years' curriculum, and will probably disappear in time. Responsive to the needs and opportunities of the territory, the university essentially lays emphasis on mining engineering. The 10 buildings which constitute the plant and dormitories of the university are situated in a campus 55 acres in extent commanding a view of the mountains on all sides. The university is maintained by federal and territorial funds. Fifty-seven sections of valuable pine land have been set apart by the federal government for the university, which will receive the title as soon as the territory is admitted as a state. By the Morrill Act of 1890 the university receives $25,000 a year which will ultimately be doubled by the provisions of the Nelson Fund, created by act of 1907; under the Hatch Act the university receives $15,000 a year; and under the Adams Act of 1906 the university will ultimately be entitled to an annual appropriation of $15,000. The territorial appropriation in 1909 was $35,500 for the year. Sums of money are also obtained from other sources, and in addition the university has two endowments. Applicants for admission to the freshman class must be at least 16 years of age and must satisfy requirements amounting to approximately 15 units. Candidates from approved high schools are admitted without examination except in English composition. Degrees of Bachelor of Philosophy and Bachelor of Science are given on the completion of a 4-year course. The total number of students in 1909 was 201, of whom 100 were in the preparatory department. There are 14 professors, 3 assistant professors, and 23 instructors and assistants. Kendric Charles Babcock, Ph.D., is the president.

ARKANSAS, STATE OF. — A part of the original territory of Louisiana, obtained from France in 1803. It was organized as a part of the Territory of Louisiana in 1805, then as a part of the Territory of Missouri in 1812, and finally as the Territory of Arkansas in 1819. In 1836 it was admitted to the Union as the 25th state. It is located in the South Central Division, and has a land area of 53,045 square miles. In size, it is a little larger than Pennsylvania and New Jersey combined. For administrative purposes the state is divided into 75 counties, and these in turn into school districts and towns. In 1900 Arkansas had a population of 1,311,564, and a density of population of 24.7. Its estimated population in 1909 was 1,494,917.

Educational History. A number of private schools were opened in the territory between 1820 and 1830. An academy was chartered in 1829, and in the same year the first law relating to public schools was enacted. This law required each county court to appoint some citizen to look after the 16th section lands and to lease them, and provided that any income from the lands should be used, under the management of the judges of the court, for the support of schools. The constitution of 1836 contained a short article, which embraced a general preamble as to the importance of knowledge and learning, made it the duty of the Legislature to care for the school lands, and obligated it to pass laws looking to intellectual, agricultural, and scientific improvement.

From 1840 to 1843 a number of special acts were passed, providing for schools in various townships. In 1843 the first general school law was enacted. This provided for the sale of the 16th section lands; provided for trustees for each township; and made provision for the examination of teachers, for a 4 months' school, for the visitation of schools, for the addition of fines and forfeitures to the school fund, and for the distribution of funds to the townships. In the same year an *ex-officio* State Board of Education was created, consisting of the Governor, the Supreme Judges of the State, the Speaker of the House, the President of the Senate, and 10 members of the Legislature, who were to report to the Legislature and to make recommendations as to laws and means of improvement. In 1853 the Secretary of State was made *ex-officio* Superintendent of Schools, and county commissioners were given general supervision of all the schools in each county. By 1854, when the first school report was made, it was estimated that about 25 per cent of the pupils of school age in the state were enrolled in public schools, and by 1860, that about 750 public schools were in operation in the state. These schools were maintained in small part by the income from the school land and school-land funds, and in large part by tuition fees. There was no general taxation for education until after the Civil War.

Beside these schools a number of academies were chartered between 1836 and 1861, charters for 62 such institutions being granted between 1850 and 1861. Many of these were female academies. Tuition fees were common in all of these schools. Three colleges, also, were chartered during this latter period. The Civil War put an end to these efforts, and closed the schools and academies. The last report issued under the old conditions states that "there are but two public schools in existence in the state."

In 1867, the legislature of the locally reorganized state passed "An Act to establish a common-school system in the State." This levied the first school tax in the history of the state, a 2-mill tax, but the tax was not to be levied "upon the property of persons of color," and the schools were not to be open to their children. A Superintendent of Public Instruction for the state and a County School Commissioner for each county were provided for. Each township was constituted a separate school district, but incorporated towns might be set apart as special districts. Three trustees were provided for each district, and a 3-months' school was kept. Taxes were collected, school officials were elected, and a number of schools were opened, but the further development of this school system was checked by the incoming of a military government, at the close of the year, which superseded the civil, and by the adoption of a new constitution and the establishment of a reconstruction government.

This new constitution of 1868 made detailed provision for a free state school system for all the children of the state; forbade any aid to religious or sectarian schools; provided for a State Superintendent of Public Instruction and for the establishment and maintenance of a state university; fixed the permanent school fund, arranged for its increase, and appropriated its annual revenue, together with a poll tax of $1.00 and "so much of the ordinary revenue of the State as may be necessary" for the maintenance of schools; further provided for a state school tax to insure a 3-months' term in every district, and for district taxes for building and furnishing schoolhouses; and converted all county school funds and the sale price for all school lands into the general treasury, and obligated the state to pay an annual interest on the same at the rate of 6 per cent. The law of 1868 carried these provisions into effect, and in addition provided for a state Board of Education, for teachers' institutes, teachers' certificates, separate schools for the two races, and for the appointment by the Governor of a circuit superintendent for each of the 10 judicial circuits of the state. These men, who were to be paid a yearly salary of $3000 each, were virtually deputy state superintendents. In 1871 these circuit superintendents were superseded by county superintendents.

The new provisions for education were the best Arkansas had so far had, but the new constitution and the laws framed under it had to bear the odium of the period of reconstruction, and the new system failed to secure the support of the people. Nevertheless, some progress was made during the reconstruction period. The number of pupils enrolled was increased to 107,908 by 1870, but by 1872 this had fallen off to 32,863. A state Teachers' Association was organized in 1869; the *Arkansas Journal of Education* was established in 1870; the institutions for the blind and deaf were reorganized and reëstablished; the University of Arkansas was established in 1871, and opened its doors in 1872, with a teacher's training course included in the curriculum; and a branch state normal school for negroes was established at Pine Bluff in 1873, and began its work in 1875. On the other hand, the electors in many districts failed or refused to levy the schoolhouse taxes; taxes, when paid, were usually paid in greatly depreciated state script; in 1873 the revenue laws were revised and the state 2-mill appropriation for schools was cut off, reducing the state aid by three-fourths; and many of the school districts, as well as many of the counties, and also the state as a whole, became deeply and often almost hopelessly involved in debt. By 1874 the burden of debt and mismanagement had become so great that the reconstruction government was overthrown, and another new constitution was adopted.

The constitution of 1874, which prevails today, also made provision for a state school system, but simplified the system, reduced expenses, and strictly limited taxation. The Secretary of State was made *ex officio* Superintendent of Public Instruction, until otherwise provided by the legislature, and the legislature was given power to establish such other school officers as might at any time seem necessary. The general school law of 1875 carried these provisions into effect, and the system adopted then has prevailed, in its main outlines, up to the present time. The office of State Superintendent of Public Instruction was reëstablished, but to the County Court, and to a county or judicial circuit Examiner was given the work usually done by county superintendents. In 1907 an optional law, by which counties may vote on the question of establishing the office for the county, was enacted. In

1899 a similar optional law was passed, by which any county may vote on the question of county uniformity of textbooks. In 1907 the first independent state normal school was provided for.

Present School System. — The school system of Arkansas is at present organized as follows: — At the head of the system is a Superintendent of Public Instruction, elected by the people for a 2-year term. He receives a salary of $2500 per year; is vested with the general superintendence of the business relating to the common schools of the state; examines the appointees for county examiners; prepares and furnishes all questions for state and county teachers' examinations; conducts the state examinations for state certificates, and grants these and life diplomas; prepares all blank forms used; with the Auditor and the Secretary of State constitutes the Commissioners of the Common School Fund, which looks after the preservation and investment of the funds and the distribution of the income; makes an annual report to the Governor on the school affairs of the state, with such recommendations as he desires to make; apportions all school money once a year to the counties; prepares a suggestive list of textbooks and apparatus from which adoptions may be made by the counties and school districts of the state; and prepares a graded common school course of study for use in the different school districts. There is no state board of education.

The administration of educational affairs in each county, except where it has been voted since 1907 to establish the office of county superintendent, is under the charge of the county court and a county examiner. The county court apportions all school money received from the state or from county funds to the different school districts, and appoints the examiner for a term of 2 years. The county examiner acts, in part, as the representative of the court. In counties divided into two or more judicial districts, an examiner may be appointed for each district. The examiner must be a resident and an elector, must hold or must obtain a first-grade teacher's license, and receives as salary an amount fixed by the county judge, which amount is usally equal to the sum of the fees paid by applicants for examination for licenses to teach. The examiner examines and licenses all teachers for the county; may revoke licenses issued, for cause; must conduct a teachers' institute each year; is enjoined to promote the interests of the public schools in his county; must make an annual report to the Superintendent of Public Instruction; and must report to the county court. In counties which have voted to have a county superintendent instead of a county examiner, the superintendent performs the duties indicated for the examiner, and receives a salary of not less than $600 nor more than $1200 per year.

Each county is divided into a number of school districts, which may be added to, divided, or dissolved by the county court, acting on petition. For each district 3 directors are elected. Transfers of children from one school district to another are made by the county court, which transfers, with the children, the taxes paid by their parents. The annual school district meeting is still retained in Arkansas as an important feature of rural school management. The meetings are invested with the power to elect school trustees, who must be able to read and write; to locate the schoolhouse; to determine by vote the amount of the district tax up to 7 mills, which may be raised for schools; to determine the length of time the schools shall be kept open, and, in case the funds are not sufficient to sustain a school for 3 months, the meeting may vote to have no school at all that year and to save the funds for the next year. In each school district the Board of Directors so elected shall make provisions for separate schools for white and colored children; "shall adopt such other measures as they may judge expedient for carrying the free school system into effectual and uniform operation"; shall have charge of the buildings and grounds; have power to employ teachers and fix their wages, and draw orders for the payment of the same, though all teachers employed must be at least four degrees of relationship removed from any school director; must adopt textbooks where county uniformity does not exist ; may permit a private school to be taught in the schoolhouse, when the public school is not in session; and must make annual reports to the district meeting and to the county examiner, or to the county superintendent where such an officer exists.

Any incorporated town or city may be organized as a special school district, by petition and special election. At the election the electors vote for or against special organization, for 6 directors, and for or against a special tax. Boards of Directors in such special districts have the same powers as similar boards in regular districts; and, in addition, may organize graded and high schools; may employ principals and superintendents; may admit pupils from other districts by their own act; may appoint boards of visitors to inspect the schools, and boards of examiners to examine teachers; and may borrow money for school buildings on notes or mortgages in the name of the district. All teachers employed in any kind of district must hold a regular state or county certificate, though the board of examiners in special districts is to examine the teachers again as to their fitness to teach in the schools of the special district.

School Support. — Arkansas originally received 886,460 acres from the 16th section grants made to the state by Congress for schools, and also two townships (46,080 acres) of saline lands for schools. The state also received two townships of land for a seminary of learning, and this, with the consent of Congress in 1844, was added to the common school land fund. The first state constitution, in 1836, made it the duty of the general assembly to improve the lands and apply the income "to the accomplishment of the object for which they are or may be intended." In 1843 the sale of these lands by survey, division into tracts of not over 40 acres, and sale by public auction was provided for by law, and the same method practically is still used. Many sales were made, but the fund accumulated was all lost before the close of the Civil War. Much was lost in Arkansas bonds and by payments made in Confederate money, and the last $8000 of the fund was appropriated to the general state fund and used to buy medicines for the Confederate troops, and the medicines were lost on a steamer which was wrecked on the Brazos River in Texas.

At the close of the war about four fifths of the lands were still unsold, and the claims of the school fund against the state amounted to three quarters of a million of dollars. The debt to the school fund has never been capitalized or paid. Since the war a new school fund of $1,135,279 has been built up. The annual state appropriation for schools consists of the interest on this, amounting in 1905–1908 to $34,035, and of the proceeds of a state tax of 3 mills, as required by the state constitution, which in 1907–1908 produced $1,018,250. This fund is apportioned to the counties on the sole basis of the number of children 6–21 years of age listed in the counties. After reaching the county treasuries, the proceeds of the $1 poll taxes (about $200,000 each year) is added, and the fund is then apportioned by the counties to the school districts on this same school census basis. No county school tax is levied. District taxation up to 7 mills may be levied by individual districts, and in 1907–1908 $1,518,250 came from this source.

The total amount expended for schools during the last year for which reports are available was $2,494,801. Based on the total population of the state this was equal to a per capita expenditure of $1.71 a year, which is an increase of 62 per cent in eight years. The South Central Division expended $1.80, the North Central Divison $5.03, and the U.S. as a whole $4.27. The average daily expenditure per pupil was 11.4 cents, and the total yearly expenditure per pupil in average daily attendance was $10.72. This is lower than in the majority of the Southern states. In amount raised for each child 5–18 years, ($5.35), the state is a little below the average for all the Southern states, but is much below the average for the U.S. as a whole ($15.52). The state is very poor relatively, as is shown by the amount ($1.41) which each male must contribute to provide $1.00 for each child 5–18 years of age. Only 5 states have to pay more, all of these being in the South. These figures, taken in connection with those for attendance and term, reveal the relative poverty and the poor educational facilities provided.

Educational Conditions. — Of the total population in 1900, 28 per cent were negroes, and 98.9 per cent were native born. In 13 counties the blacks exceed the whites, and in 4 counties they exceed the whites by or over 4 to 1. The state is rural and agricultural, as 91.5 per cent lived in country districts in 1900, and but 5.4 per cent in cities of 8000 inhabitants or over.

The average length of term provided in Arkansas was 93.9 days as against 118.2 days for the South Central Division, and 154.1 days for the U.S. as a whole. No other state except North Carolina and South Carolina provided less than 100 days of school.

In percentage of the school population, 5–18 years of age, enrolled in the schools (74.27 per cent), and in the percentage of the number enrolled, in average daily attendance (63.56 per cent), Arkansas is a little below the average for the South Central Division. This is equal to an average daily attendance of 59.7 days for each pupil enrolled, and 44.3 days for each child 5–18 years of age, as against 75.7 and 49.0 days for the South Central Division, and 109.3 and 76.1 days for the U.S. as a whole. Two states were lower than Arkansas in either item. No statistics are available to enable one to separate the above percentages for white and colored schools.

The state has a combined compulsory attendance and child labor law, but no means of enforcing it or of regulating truancy are provided. Twelve weeks of schooling are required of all children under 14, and children under 12 shall not be employed in any factory or manufacturing establishment unless a widowed mother or a totally disabled father is dependent upon the labor of the child for support, but in no case shall a child under 10 be allowed to work.

Little is taught in the schools beyond the common branches, except Arkansas history. Manual training is taught in but two cities in the state. The schools are only partially graded, and many offer only an incomplete elementary school course. The schools leave much to be desired, and, considered broadly, are among the poorest in the South.

In illiteracy, according to the census of 1900, one person in five could not read or write, the percentage being 20.4 per cent. As between the races, 11.5 per cent of the whites and 43 per cent of the negroes were illiterate. These are about average percentages for the Southern states.

In material conditions, despite rapid advances made within the past eight years, the schools are still poorly housed and poorly financed, and the teachers are poorly paid. The estimated average value of all the schoolhouses in use in the state, public and private, was only $706. In June, 1906, the School Directors reported 1102 schoolhouses out of a total of 5238 as being worth less than $100 each, and nearly one half of this number as worth less than $50 each. No state aid has been granted toward building better schoolhouses, as has been done in a number of southern states, and there is no supervision of schoolhouse plans.

Teachers and Training. The state employed 8297 teachers. Of these 46 per cent were men; and 19 per cent were for colored schools. No statistics are available from which the percentages of teachers who have had any kind of professional training can be calculated, but something of the professional status of the teaching force can be determined from the kinds of teachers' licenses held. The third-grade license, based on an examination in reading, writing, spelling, grammar, arithmetic, geography, and U.S. history, and good for only 6 months, was held by 22 per cent of the teachers: the second-grade license, based on the third-grade subjects and the history of Arkansas, physiology, and the theory and practice of teaching, in addition, and valid for 1 year, was held by 31 per cent of the teachers; the first-grade license, based on the second-grade subjects and civil government and elementary algebra, in addition, and good for 2 years, was held by 45 per cent of the teachers; state licenses, based on the first-grade subjects and an examination in algebra, plane geometry, general history, rhetoric, and civil government, in addition, and good for 6 years; and life diplomas, issued on still further examination in physics, mental philosophy, Latin, natural history, constitutions of Arkansas and the U.S., and art of teaching, were together held by but 2 per cent of the teachers. It is impossible to separate the percentages for white and negro teachers.

The average monthly salaries by grades of license were: —

License	Males	Females	Both
State	$——	$——	$73.52
First Grade	48.12	40.40	——
Second Grade	38.06	34.60	——
Third Grade	33.24	30.40	——

With an average length of term of 93.9 days for the 75 counties, with 4 counties averaging less than 60 days, with but 18 counties averaging over 100 days, and with 46.0 per cent of the teachers men, the quality of the service rendered may be imagined.

As a means of improving the teachers in service an institute of one week must be held by the county examiner or superintendent in each county, in June of each year, and for 3 days' attendance teachers may have their licenses to teach renewed for the time for which they were originally granted, though not exceeding one year; third-grade licenses cannot be renewed more than once; and second-grade licenses more than twice. If a teacher's license expires during the term for which he or she was employed to teach, no further license is necessary to complete the term.

For the training of teachers the state university has maintained a normal department since it began, and the branch normal school for negroes at Pine Bluff has been in existence since 1875, but, though repeatedly urged by successive state superintendents, nothing was done toward establishing a normal school for white teachers until 1907.

Secondary Education. — The number of special school districts is constantly increasing, and in these graded schools have been organized, and, in some cases, more or less complete high schools as well. There are now about 200 special districts in the state, out of a total of more than 5000 districts. The last report showed there were 94 public high schools in the state, with an average enrollment of about 50 students and an average of 2.5 teachers to the school, and 16 private high schools with about 75 pupils and 3 teachers to the school. Seven of the public high schools were for the negro race. No high school law and no special qualifications for high school teachers exist, and where high schools are formed they are supported wholly by local taxation. The high schools which exist are only partially complete, and a high school system for the state is yet to be evolved.

Higher and Technical Education. — The University of Arkansas (*q.v.*), at Fayetteville, was opened in 1872. In addition to the state university there are 9 denominational colleges in the state, all established since 1872, 2 of them being for negroes. They have small endowments, and do a relatively low grade of work. The state also maintains the Arkansas School for the Blind, and the Arkansas Deaf-Mute Institute, both located at Little Rock.

The following is a list of colleges in the state: —

Institution	Location	Opened	Control	For
For Whites				
Arkansas College	Batesville	1872	Presby.	Both Sexes
Hendrix College	Conway	1884	M. E. So.	Both Sexes
Ouachita College	Arkadelphia	1886	Bapt.	Both Sexes
Henderson College	Arkadelphia	1890	Meth.	Both Sexes
Ark. Cumberland College . . .	Clarksville	1891	Cumb. Presb.	Both Sexes
Central Baptist College . . .	Conway	1892	Bapt.	Women
For Negroes				
Arkansas Baptist College . . .	Little Rock	—	Bapt.	Both Sexes
Philander Smith College . . .	Little Rock	—	M. E.	Both Sexes
Southland College	Southland	—	Friends	Both Sexes

E. P. C.

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ARKANSAS BAPTIST COLLEGE, LITTLE ROCK, ARK. — A coeducational institution owned and controlled by the negro Baptists of Arkansas, and organized in 1884. Literary, religious, and industrial training is the aim of the college. Grammar school, academic, college, and music departments are maintained, and commercial and theological courses are given. It is intended to lay stronger emphasis on industrial training, and the Griggs Industrial Farm awaits development as soon as funds can be obtained. The large majority of the pupils are in the grammar school and academic departments. Degrees of Bachelor of Arts and Bachelor of Theology are given. There are 15 instructors in the institution. Jos. A. Booker, A.M., D.D., is the president.

ARKANSAS COLLEGE, BATESVILLE, ARK. — A coeducational institution organized in 1872 and under the control of the Synod of Arkansas of the Presbyterian Church of the United States. Preparatory and college departments are maintained. Admission to the college is by requirements equivalent to about 8 points work in high school. Degrees are granted by the college. There is a faculty of 7 professors and several assistants. Eugene R. Long, A.M., Ph.D., is the president.

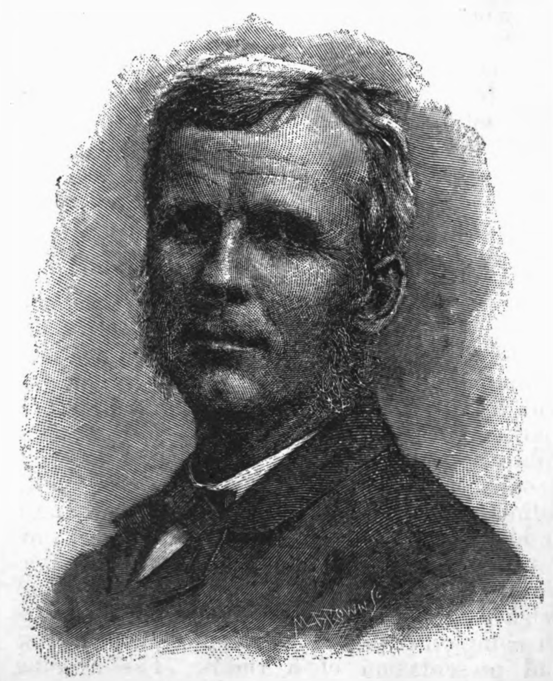
ARKANSAS CUMBERLAND COLLEGE, CLARKSVILLE, ARK. — A coeducational institution under the auspices of the Arkansas Synod of the Presbyterian Church. Primary, academic, college, and fine arts departments are maintained. Free tuition is given to probationers for the ministry. A normal course for teachers is offered, preparing for teachers' certificates. Admission to the college is by requirements equivalent to about 6 points of high school work. There is a faculty of 12 members. Rev. G. D. Crawford, D.D., is the president.

ARKANSAS, UNIVERSITY OF, FAYETTEVILLE, ARK. — A state institution for the provision of higher education, organized in 1871 under the Morrill Act of 1862, the benefits of which were accepted, as also of the Act of 1890, the Hatch Act of 1887, and the Adams Act, 1906. Tuition is free, except in law, medicine, music, and art. The plant consists of 11 buildings and dormitories. Admission is by examination requiring at present 11½ units, to be raised up to 14 units by 1912. Certificates of accredited schools are also accepted for admission. The following departments are included in the university: the college of liberal arts, sciences and engineering, the college of agriculture, the agricultural experiment station, the conservatory of music and art, and the preparatory school, all located at Fayetteville; at Little Rock are the medical and law schools; and at Pine Bluff the branch normal school. The preparatory school offers a course of one year only. A department of secondary education is maintained by the university to inquire into high school conditions, to organize such schools, and exercise supervision over them. Degrees are given in all departments of study except the normal course, in which a certificate, accepted as a license to teach in a state school for 6 years, is given. There are 25 professors, 7 associate, and 10 adjunct professors, and 27 instructors and assistants at the Fayetteville departments. John Newton Tillman, LL.D., is the president.

ARMENIA, AMERICAN SCHOOLS IN. — See MISSIONS, EDUCATIONAL ASPECT OF MODERN.

ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO, ILL. — Founded in 1892 by Philip D. Armour of Chicago "for all who are earnestly seeking technical education"; the aim of the institute is, broadly, "to help those who wish to help themselves." The Institute is intended to afford a combination of "broad scientific training with the elements of liberal culture." There are included in the Institute the college of engineering, Armour Scientific Academy, evening class instruction, and summer courses. Of these the scientific academy, which offers a preparatory course to the college of engineering, is to be discontinued after the academic year 1909–1910. The college of engineering is organized in 14 departments, giving courses in mechanical, electrical, civil, chemical, and fire protection engineering; architecture, mathematics, physics, English, history, and political science, language, economics, and philosophy, physical culture and graduate work. Admission is by certificate from an academy or high school of good standing, or by examination, the requirements for which are equivalent to 15 units. The degree of Bachelor of Science is given in the different departments on completion of a 4 years' prescribed course and presentation of a thesis. The evening classes are arranged to meet the needs of those who are engaged during the day in technical pursuits. Shop work is given, and a college preparatory course is offered. Correspondence school students largely avail themselves of these facilities. The plant includes 5 buildings, while the architectural and fire protection engineering courses are carried on in buildings at some distance from the main institute. The laboratories contain the most modern equipment, and afford excellent facilities for research. The library contains 25,000 volumes, 2500 pamphlets and 150 periodicals, and is primarily a reference library for engineering students. Among the publications of the Institute are the *Armour Engineer*, a semi-annual technical publication, and the *Integral*, an annual publication edited by the junior class. The Chapin Club, organized in 1907, has for its object the promotion of the social interests and welfare of the students. In 1908–1909 the students were distributed as follows: in engineering — 170 in electrical, 141 in civil, 104 in mechanical, 45 in chemical, 17 in fire protection; in architecture, 100; special students, 21; 615 students took evening classes. The faculty includes 12 professors, 11 associate professors, 12 assistant professors, and 25 instructors. The value of the plant is estimated at $5,000,000; the productive endowment is $1,500,000, and the annual income is $215,000. Frank Wakeley Gunsaulus, D.D., LL.D., is the President.

ARMSTRONG, SAMUEL CHAPIN (1839–1893). — The organizer of the Hampton Institute, for negroes and Indians, was born on the Hawaiian islands, of missionary parents, Jan. 30, 1839. He received his preliminary education in the Oahu College, Hawaii and was graduated from Williams College. For several years he was connected with the department of public instruction of Hawaii, where he obtained the expert knowledge of the educational needs of backward peoples which was subsequently of so much value to him in his work among the negroes and Indians. He was at the head of a colored regiment during the Civil War, retiring at its close with the rank of brigadier-general. He was selected by General Howard as superintendent of education of the Freedmen's Bureau (*q.v.*) for Virginia. Two years later (1868), realizing the industrial needs of the colored people, he organized the Hampton Normal and Agricultural Institute (*q.v.*), the parent of many such institutions in America. During the 25 years that he directed Hampton (1868–1893), General Armstrong practically fashioned the educational policy of the native Indians and the negroes, and the men and women that he trained became the leaders among their own people. He was the author of several papers on the education of negroes and Indians.



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W. S. M.

See HAMPTON INSTITUTE.

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ARNAULD, ANTOINE. — After St. Cyran (*q.v.*) the most important member of the Port-Royal (*q.v.*). Born in 1612, the son of a lawyer, he was early destined to enter the same profession as his father. He changed, however, from law to theology. He obtained the doctorate in 1641, and entered the Society of the Sorbonne in 1643. In the same year he wrote his *Livre de la fréquente communion*, which brought upon him the enmity of the Jesuits, who persecuted him for the rest of his life with their attacks. Arnauld was a strong defender of Jansenism. In 1656 he was excluded from the Sorbonne. In 1648 he had joined the Port-Royalists. Although he did not teach, he expresses a keen interest in education, and wrote a *Memoir on the Regulations of Studies in the Humanities* (*Mémoire sur le Réglement des Études dans les Lettres humaines*). Many of his writings were on school subjects, and many others he inspired. Among these are the *General Grammar* (*Grammaire Générale*), 1660; *Elements of Geometry* (*Éléments de Géometrie*), 1660–1661; the treatise on Logic (*Logique*), 1662. In 1679 Arnauld was compelled to leave France, and spent the rest of his days in Belgium, like so many of his friends, trying to find a new home. He died in Brussels in 1694.

See article on PORT-ROYAL.

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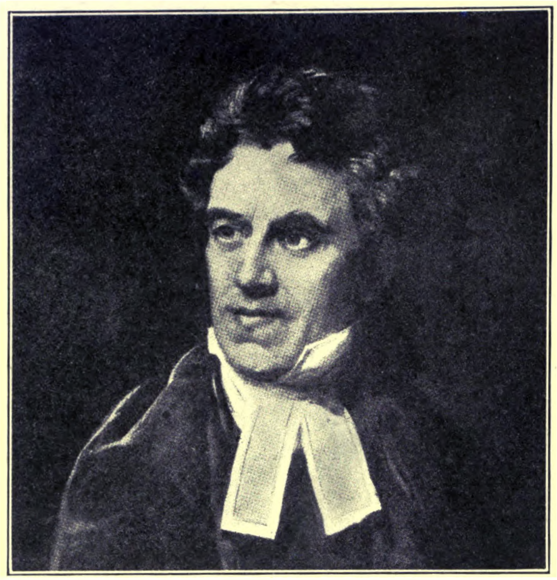
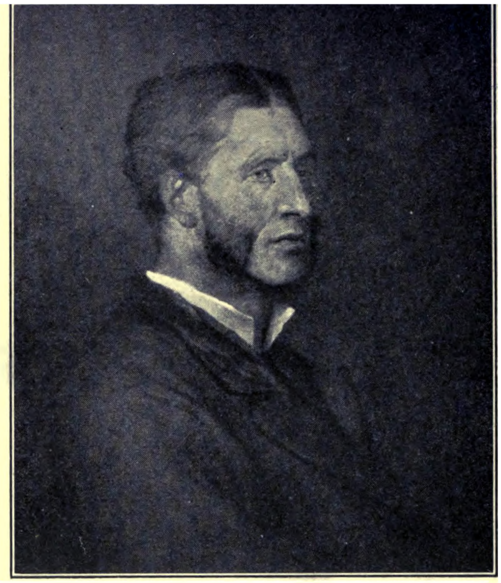
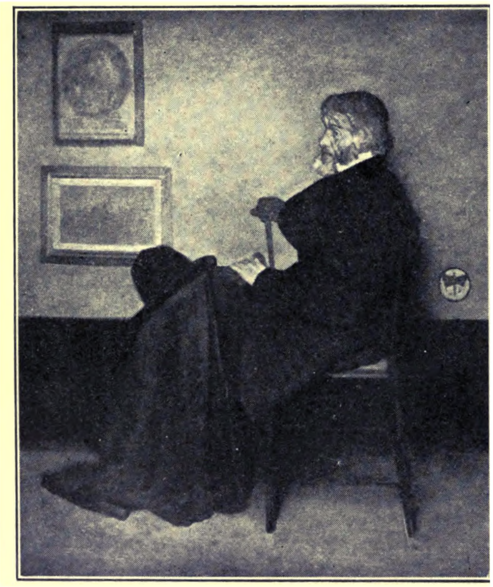
ARNDT, ERNST MORITZ (1769–1860).— A German patriot and poet. Born at Schoritz



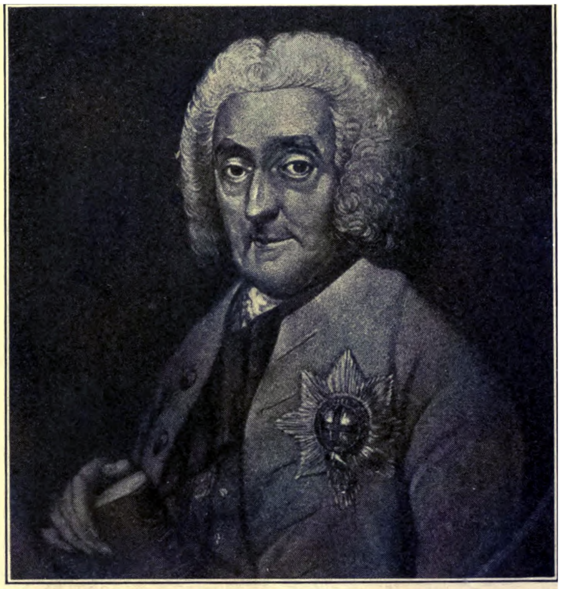
Thomas Arnold. (See p. 220.)



Matthew Arnold. (See p. 219.)



Thomas Carlyle. (See p. 533.)



Lord Chesterfield. (See p. 596.)

A GROUP OF ENGLISH MEN OF LETTERS — WRITERS ON EDUCATION.

on the island of Rügen, which then belonged to Sweden, he received his education at the gymnasium of Stralsund and the universities of Greifswald and Jena. In 1800 he began to lecture in Greifswald on history and philology. His history of serfdom in Pomerania (1803) brought about the liberation of the Pomeranian peasants. His real life work commenced in 1806 with his attacks on Napoleon in his *Spirit of the Times* (*Vom Geist der Zeit*). On account of this he was forced to flee for his life; he went first to Sweden, and finally, in 1812, to St. Petersburg. From there he issued a large number of patriotic articles and pamphlets which were very influential in rousing the German people for their war of liberation from the Napoleonic despotism. After Napoleon's defeat in Russia, Arndt returned to Germany, where he continued his literary activity. Some of his inspiring war lyrics, such as *Was ist des Deutschen Vaterland?* and *Der Gott, der Eisen wachsen liess, der wollte keine Knechte*, are sung in German schools to this day. In 1817 he was called as professor of history to the newly established University of Bonn, but, incurring the displeasure of the government on account of his liberalism, he was suspended from office in 1820 and remained in retirement until restored on the accession of Frederick William IV in 1840. The following year he was elected Rector of the University, and in 1848 sent as a delegate to the first German parliament in Frankfort. His ninetieth birthday was celebrated with great enthusiasm all over Germany in 1859; a month later he died in Bonn.

"Father Arndt" was a typical representative of German idealism; he had a deeply religious nature, full of the love of his country and of liberty. As a university teacher he was very popular, not on account of great scholarship, but through his inspiring eloquence and personal magnetism. His special contributions to pedagogy are chiefly contained in his *Fragments on Human Education* (1805). His ideas on education are based on those of Rousseau; he insists on a harmonious development of the physical, æsthetic, moral, and intellectual nature of the child, on teaching by induction, and a careful study of the individuality of children.

F. M.

ARNOBIUS, THE ELDER, (also known as **AFER**). — A Christian writer born during the latter part of the third century in Sicca Venerea in Numidia. Nothing is known of his early life and training, but from the fact that he was a rhetorician by profession it must be inferred that he had received the usual course of discipline in the schools. After his conversion to Christianity he wrote a work in seven books called *Adversus Gentes*, the main object of which was to refute the charge that the calamities of the world were caused by the "impiety" of the Christians. It is not a profound work, though skillful use is made of the current criticisms of the opponents of the new faith. It reveals the influence of his rhetorical training. In the second book he discussed the nature of the soul with considerable acumen, advancing the somewhat unusual doctrine that a belief in the soul's immortality has a prejudicial effect on human life. He combated, as Justin did, Plato's theory that knowledge is essentially reminiscence. The argument of the *Meno*, he declared, does not prove that the answers given by the slave to the geometrical questions of Socrates were owing to a knowledge of the subject already existing in him; but (1) to the use of his own intelligence (*intelligentia*), and (2) to the methodical manner in which the questions were put to him. As an apologist and critic Arnobius exerted but small influence, and his chief significance for education lies in his discussion of the soul.

H. D.

(The works of Arnobius have been edited by Oehler (1846) and others, and translated into English as Vol. XIX of the *Ante-Nicene Library*. Cf. E. Klussmann, Arnob. und Lucretius, in *Philologus*, Vol. XXVI, 1867.)

ARNOLD, MATTHEW (1822–1888). — Son of Dr. Thomas Arnold of Rugby; educated at Rugby, Winchester, and Balliol College, Oxford; Fellow of Oriel College (1845); for a short time master at Rugby; Inspector of Elementary Schools under the Education Department (1851–1886), during which period he published almost all his poetry and prose writings. In 1859 he was appointed Assistant Commissioner to the Royal Commission, which, under the Duke of Newcastle, inquired into the state of popular education in England. On behalf of the Commission, he investigated the state of education in France, Switzerland, and Holland, and reports which he based upon his inquiries were subsequently published as part of the *Report of the Commission.* In 1865 he was appointed by the Schools' Inquiry Commission to investigate the system of education of the middle and upper classes in France, Germany, Switzerland, and Italy. His report was published by the Commissioners. As Inspector of Schools he wrote general reports on Elementary Schools in 1852–1858, 1860, 1861, 1863, 1867, 1869, 1871, 1872, 1874, 1876, 1878, 1880, 1882, and reports on some of the Training Colleges at intervals between the years 1853 and 1868. These reports were subsequently edited and published by his friend, Lord Sandford.

Matthew Arnold exerted strong influence on English educational ideas for three reasons: (1) He was one of the English writers of high distinction who have pressed upon the nation the fundamental importance of public education as a factor in the well-being of the state. Thousands of men and women holding high positions in government and in society had their thoughts turned by Matthew Arnold's writings to the subject of education, from which they would otherwise have shrunk from lack of interest in its ordinary presentation. Much of the administrative interest in public education which became noticeable in England in the last twenty years of the reign of Queen Victoria may in part be traced to the literary influence of Matthew Arnold. (2) He took delight in making his fellow countrymen feel ashamed by contrasting the meager educational activities of the English State and those of France, Germany, and other continental peoples. Having grown up at a time when the English nation was strongly self-confident and little inclined to admit the superiority of any foreign system of social organization, Arnold indulged himself in the opposite habit, and idealized foreign systems of education and government, partly with the intention of impressing his fellow citizens with the need for reform, partly from a natural tendency to see the weak side of English habits of mind and to overestimate the merits of Continental methods of education. (3) He was one of the literary leaders of the reaction against individualism in English national life and against the influence (wrongly identified by him with Puritanism) which minimized the functions of the State in promoting collective well-being by means of public education and state-aided culture. Matthew Arnold's influence was increased by the fact that he was the son of the man who had been the chief reformer of the English public schools. Brilliant in literary criticism, a master of political irony, politely pitiless in his satire of English social and intellectual prejudice, he helped in making England self-conscious, dissatisfied with itself, vaguely collectivist in its educational ideal, and ready to accept immense development of public expenditure and of state inspection in educational work. His influence was solvent, unsettling, provocative, with a certain foreign strain in it which went with a lack of insight into the historical significance of many points of view traditionally accepted in England. Of foreign schools and political institutions he was an impressionable observer rather than a sagacious critic. He rarely struck a true balance between the satisfactory and the mischievous results of any form of governmental control in education; he was a brilliant impressionist rather than a scientific investigator. He idealized the action of the State without measuring the practical effects of organized bureaucracy. In his political ideal, his father's almost Hebraic theocracy had faded into a somewhat dilettante admiration for governmental action, for many of the practical results of which he would himself have felt profound distaste. For the more scientific study of educational methods as applied to the problems of teaching he showed comparatively little aptitude. A responsible officer of the Education Department during the years in which the system of "payment by results" deeply injured the work of the best English elementary schools, he did comparatively little, even in his public writings, and still less by personal influence and protest, to check administrative tendencies which were hurtful to the best interests of English elementary education. But no English writer of his time, with the exception of Herbert Spencer (*q.v.*) and possibly of Huxley (*q.v.*), did so much in popularizing the discussion of educational problems. He approached them, however, from the point of view of political philosophy and government, rather than from the standpoint of psychology or physiology. He thought rather loosely about forms of public control in education, and, while weakening respect for individual enterprise, threw but little light upon the defects of organized democracy in the sphere of educational government. He was strongly impressed by the achievements of Germany in the public provision of secondary and higher education, but did not press to any point of thoroughness his inquiry into the fundamental differences between different forms of national organization. As an educational writer, his chief service to England lay in his reiterated and urgent advice in regard to the provision of a liberal secondary education for the masses of the people; but his achievements as an educational thinker were on a much lower plane than his work in poetry and in literary criticism.

M. E. S.

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ARNOLD, THOMAS (1795–1842). — Headmaster of Rugby School, 1828–1842; was born at Cowes in the Isle of Wight, where his father was Collector of the Customs. He was educated (1803–1807) at Warminster (where he was much influenced by reading Joseph Priestley's *Lectures on History*) and at Winchester College (1807–1811). From his Winchester experience he derived many of his ideas as to school discipline and as to the benefit of intrusting elder boys in a school with authority over the younger. See his article on the discipline of public schools in 1835. Winchester traditions (among the most ancient in English education) largely influenced Arnold when in later years he reorganized the school life at Rugby.

In 1811, in his sixteenth year, he was elected Scholar of Corpus Christi College, Oxford; in 1814 he was placed in the first class in *Litterae*

Humaniores. As an undergraduate at Corpus he became the intimate friend of J. T. Coleridge and of John Keble. Through Coleridge, Arnold became acquainted with the *Lyrical Ballads* and the first edition of Wordsworth's poems. The young men became zealous disciples of Wordsworth's philosophy. The teaching of the Lake poets brought out in Arnold, who had a natural leaning toward practical and evidently useful studies, a feeling for lofty and imaginative thoughts which had a great spiritual influence upon his life. Arnold took particular delight in long country rambles, in the beauties of nature, and in the sea and shipping. Always impressionable, and insensibly changing his point of view under the dominant opinions of his time or of valued friends, Arnold owed much to the influences of his early education at Winchester and Oxford, the effects of which were never effaced from his mind and character. He evidently obtained more valuable education from his contemporaries, especially at college, and from his private studies, than from the actual instruction wihch he received from his tutors. He thus learned to appreciate the educational value of corporate and collegiate life and to assign a high value to the influence of a school community upon each of its individual members. In 1815 he was elected Fellow of Oriel College, then the center of the most active intellectual life in the university. Here he became acquainted with Richard Whately (afterwards Archbishop of Dublin) and John Henry Newman, and found himself in the vortex of theological discussion. Taking Holy Orders in 1818, he settled in the following year at Laleham (on the banks of the Thames near Staines), with his mother, aunt, and sister. Here (having married Mary Penrose in 1820) he remained for nine years, taking seven or eight young men as private pupils in preparation for their university life. In boyhood and early youth he had been somewhat indolent, morbidly restless, apt to indulge himself in vague schemes without definite purpose, and beset by intellectual doubts as to the realities of religious belief. During his life at Laleham he underwent a great change, visiting much among the poor, becoming intensely religious, and forming habits of indefatigable industry and perseverance. "The most remarkable thing," wrote a former pupil, " which struck me at once on joining the Laleham circle, was the wonderful healthiness of tone and feeling which prevailed in it. Everything about me I immediately found to be most real; it was a place where a newcomer at once felt that a great and earnest work was going forward. Dr. Arnold's great power as a private tutor rested in this, that he gave such an intense earnestness to life." Thus at Laleham Arnold developed his great powers as a teacher of young men (he was always more successful with older boys than with young ones) and his intense reality of religious and political conviction. At Laleham also he began his first edition of Thucydides and his studies in the history of Greece and Rome. In 1825, in order to read Niebuhr's *History of Rome,* he learned German. Theocratic in his instincts, he desired to apply the principles of the Gospel to the legislation and administration of the modern State. He opposed the quietism and intellectual inertia of the Evangelicals, and the tendency of the Tractarians to separate Church from State. His ideal was a political community interpenetrated by Christian principles, and applying those principles in its laws and administration — the latter including a system of national education.

In December, 1827, he was elected headmaster of Rugby. One of his friends, Dr, Hawkins, afterwards Provost of Oriel, predicted that if Arnold were elected to the headmastership of Rugby he would change the face of education all through the public schools of England. In August, 1828, he entered upon his new office. When he became headmaster of Rugby, he found a general feeling of dissatisfaction with the condition of the public schools. The older classical curriculum was vehemently attacked on the ground of its narrowness and inutility. The absence of systematic attempts at Christian education in the public schools had become a scandal in the eyes of religious men. Many thought that the whole system would soon be destroyed. It was clear that a great reformation was necessary and that this would be extremely difficult, owing to the conservatism of the institutions concerned. Arnold determined that he would devote his life to the internal reform of the great public school, to the raising of its ideals of corporate life, to checking the thoughtless waste and selfishness of schoolboys, and to inculcating into their minds the principles of reverence for the law and regard for the claims of the poorer classes. He therefore viewed his administration at Rugby as a political experiment of far-reaching importance. His energy was boundless; he threw himself vehemently into a contest against evil. Conscious of his own integrity, and contemning worldly advantage, he was bold in policy, regardless of attacks. More than once he resisted the attempts of his governing body to interfere with his independence of action; he insisted upon having complete control over the administration of the school, and over his own private occupations. He claimed and exercised complete liberty of opinion and action in regard to current politics, and was at one time nearly dismissed from the headmastership for alleged political partisanship. The freedom which Arnold claimed would have been impossible under any system of higher education directly controlled by the State. His openness of speech on current questions of political controversy and his vigorous participation in discussions on social and political questions would have been regarded as incompatible with the neutrality of a civil servant.

Arnold's relations with his assistant masters were exemplary. He regarded their coöperation in the government of the school as essential; he was entirely free from jealousy of his subordinates, and rejoiced when they gained independent reputations. He was deeply impressed by the evil influence often prevailing in a community of boys living in an atmosphere of tradition and in almost monastic seclusion from the society of women, but he thought that these conditions of education, though perilous, served also to promote manly growth of character, and therefore should be reformed, not overthrown. " Another system," he said, " may be better in itself; but I am placed in this system and am bound to try what I can make of it." He regarded religious influences and religious teaching as essential to the welfare of the school. He endeavored to hasten the change from childhood to manhood without prematurely exhausting the faculties of body or mind. Many of his pupils and contemporaries thought that he overpressed boys by his appeals to their moral thoughtfulness, and that he prematurely burdened them with moral responsibilities beyond their age. He wished, so far as possible, that things should be done by the boys and very little for them, and therefore appealed to their common-sense and trusted to their conscience. Lying to the masters he made a great moral offense; he placed implicit confidence in a boy's assertion, but if a falsehood were discovered, he punished it severely. " There grew up in consequence," says Dean Stanley, "a general feeling that it was a shame to tell Arnold a lie — he always believes one." He laid great stress upon the mutual responsibilities of a school unity. " Is this a Christian school ? " he once indignantly asked the boys at a time when he had discovered traces of an evil influence. " I cannot remain here if all is to be carried on by constraint and force; if I am to be here as a gaoler I will resign my office at once." He insisted on the right to expel boys whose influence he believed to be hurtful. He once said to the assembled school, " It is not necessary that this should be a school of 300 or 100 or of 50 boys; but it is necessary that it should be a school of Christian gentlemen."

Arnold modified the severity of punishment, especially in the higher parts of the school. He retained flogging, but confined it to moral offenses. He determined to improve to the utmost the existing machinery of the sixth form and of fagging, by placing in the hands of the 30 boys who composed the highest class special responsibilities and powers. In this he largely followed the tradition of Winchester. He placed the aims of school life in the following order: (1) religious and moral principles, (2) gentlemanly conduct, (3) intellectual ability. He treated the sixth form like officers in the army and navy, relying on their moral courage to assist him in his government of the school. He discouraged the practice of sending boys of tender years to a public school, and encouraged the development of preparatory schools under private teachers. He endeavored to give reality to the religious life of the school. In his own class, he said a special prayer before his lesson, over and above the general prayers read before the whole school. He had a strong belief in the general union of moral and intellectual excellence; for mere intellectual acuteness he had little respect. He liberally contributed toward prizes and scholarships as incentives to study. He devoted much of his leisure to the preparation of new examinations for various classes and to a yearly examination for the whole school. He kept up his personal intimacy with pupils who had left the school. He was a strong advocate of classical education, but in his hands the study of Greek and Latin authors was permeated with interest in modern questions. He discarded in his teaching mere verbal criticism and many of the elegant refinements of scholarship. He made the study of modern history and modern languages and of mathematics more important in the course of education at Rugby. In teaching he questioned largely, making his explanations as short as possible and steadily checking himself from imparting too much information. He encouraged boys to read and think for themselves. He was always ready to acknowledge mistakes in his own scholarship, and never concealed his own ignorance. He was a master of extemporary translation from Latin and Greek into good English, a power which he had begun to acquire at Winchester and steadily developed through later life. His teaching of history was stimulating and vigorous. It was always his wish that his pupils should form their opinions for themselves and not take them on trust from him. " It would be a great mistake," he said, " if I were to try to make myself here into a Pope." The result of his teaching was to make his more sensitive pupils " appreciate moral agreement amidst much intellectual difference."

His most powerful influence over the school was exerted from the pulpit. He preached every Sunday afternoon, and his sermons deeply moved those who heard them. Dean Stanley well describes the interest and attention which the boys gave to the sermons and the lasting impressions which they carried away.

Arnold broke down the old tradition of aloofness practiced by the masters of the English public schools. "Many of the boys, especially the younger, feared him, but out of this feeling of fear," wrote Dean Stanley, "grew up a deep admiration partaking largely of the nature of awe, and this softened into a sort of loyalty, which remained even in the closer and more affectionate sympathy of later years." Arnold's influence was not confined to Rugby. The headmasters of other schools, especially Winchester and Harrow, were inspired by his example, and to Arnold may be traced a great moral revival in the English public schools, and their strong hold upon the affections of Englishmen. He practically saved the English public school system from destructive attack. Had it not been for Arnold, it is probable that English higher secondary education would have passed more or less completely under the control of the State. Arnold's personality captivated the imagination of England; his heroic figure stood for an educational ideal. English people realized that state control would be incompatible with the retention of any such vigorous personality in the service of the great public schools. His constant appeal to the value of historical tradition found a sympathetic echo in the English mind. Under Arnold's influence ancient foundations for the higher education of boys in England renewed their youth. A large number of other schools were established on similar principles, and the semi-independent corporate foundations formed the type upon which the new schools were modeled. Arnold's great originality lay in his moral personality. He reinvigorated an old system and transformed its inner life. The romantic halo which surrounds his name is partly due to the fact of his sudden and early death, which took place at Rugby at the end of the summer term of 1842. The impression produced by the news upon the minds of boys who had been educated by him is described by Thomas Hughes in *Tom Brown's School Days*. Arnold's influence was also greatly extended by the publication of his *Life and Correspondence* edited by his favorite pupil, Arthur Stanley, afterwards Dean of Westminster. M. E. S.

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ARRESTED DEVELOPMENT. — See Retardation.

ART, APPLIED. — See Design.

ART IN EDUCATION. — A study of education in its earlier forms, not only in savage communities, but in a civilization as advanced as the Athenian, reveals the great rôle played by the arts. Anthropological investigations have confirmed the obvious educational influence by showing the great part played by the arts in the life of the community and in determining progress. Psychology adds to these convictions the fact of the fundamental character of the impulsive tendencies which are the physiological origin of the activities that lead to the arts. All of these facts are opposed to the common assumption that the arts represent a kind of educational luxury and superfluity.

Various classifications have been made of the arts, — they have been subdivided into the spatial and the temporal, arts of rest and motion, of the eye and the ear, etc. However correct for their own purposes, these divisions are educationally defective in that they start from art products rather than from the psychophysical acts from which these products originate. More significant from the educational point of view is the classification of Santayana according to which arts are distinguished into those that spring from automatisms, *i.e.* organic or "spontaneous" movements which, when rhythmically ordered and accompanied by intensified emotion, themselves constitute acts, and those in which the movements, even if similarly induced originally, terminate in effective enduring modifications in natural objects. The dance, pantomime, song, music, etc., belong in the first class; the second class Santayana terms "plastic," including in it architecture, sculpture, painting, and design.

Anthropological and historical inquiry have fairly established the following principles: first, that art is born of primary impulses of human nature when the activity, whether automatic or plastic, has social value; second, that this social value is conferred by the tendency of the activity or its product to spread an emotional mood favorable to joint or concerted action. Otherwise put, the arts, in their origin, tended to contagion or communication of an emotion, that produced unity of attitude and of outlook and imagination. From this point of view, no sharp line divided the fine and useful arts from each other. Any useful object — a piece of pottery, of weaving, an implement of hunting — that provokes social reminiscences and anticipations attaches contagious emotions to itself, and acquires æsthetic quality. The marked distinction between useful and fine arts is chiefly a product of slave labor or of commercial production, making things for a market, under circumstances where the factor of shared emotional life is eliminated.

Another significant trait of the arts in their simple and more natural form is the prominence of the festal element. Tribal dances are the background, out of which music, poetry, and the drama all gradually differentiated. These pantomime dances were either occasional or ceremonial, *i.e.* they were either community celebrations of more or less choice episodes happening to attract general attention, or else were stated and recurrent celebrations of important tribal traditions and customs, attaching to changes in the season, return of food animals, gathering crops, war expeditions, etc.

Some of the educational bearings of these considerations, psychological and ethnological, come out conspicuously in the older Athenian education. Music (in the Greek sense) and gymnastic were, in general, and in many of the details of their educational use, very direct outgrowths of the rôle of the dramatic and communal arts of more primitive societies. It is not difficult to detect in Plato's treatment of gymnastics in the *Republic* and the *Laws* the fact that dances, etc., originally associated with industrial and military crises in the life of a people, had become so saturated with elements of rhythm, measure, and order, and with social memories and hopes, as to present great value in the training of the young; while music was frankly a vehicle for carrying what was of typical or idealized value in the traditions of the Greek people, by enhancing their emotional value so that they would deeply, though unconsciously, modify the character of children's tastes and likes and dislikes in the direction that reason would later consciously approve.

If we attempt to summarize the meaning of the facts mentioned in this brief summary for present educational practice, the following points stand out clearly: —

1. There has been great loss in relegating the arts to the relatively trivial rôle which they finally assumed in schooling, and there is corresponding promise of gain in the efforts making in the last generation to restore these to a more important position. Viewed both psychologically and socially, the arts represent not luxuries and superfluities, but fundamental forces of development.

2. Instead of æsthetic appreciation, the sense of beauty, etc., coming first and leading to artistic expression in order to satisfy itself, the order is the reverse. Man instinctively attempts to enhance and perpetuate his images that are charged with emotional value by some kind of objectification through action. The outcome inevitably is marked by certain factors of balance, rhythm, and constructive order, and by the function of representation, *i.e.* of recording in some adequate way the values to which emotions cling. The sense of beauty, or æsthetic appreciation, is a reflex product of this attempt at production. A product, which is objectively crude, but which represents a genuine attempt at embodiment of an experienced value of unusual emotional quality, is more likely to be an effective means of cultivating taste and æsthetic sensitiveness than the presentation for passive appreciation of much more perfect works produced by others. The latter are indispensable, but their function is to serve as models which will stimulate to appreciation of crudities and imperfections that may be refined away, and to enlarge the emotional images out of which personal expression springs. In the end, the great majority of pupils are of course to become appreciators of art rather than its producers in any technical sense. But only by taking some part in creative production (and that not for the sake consciously of producing beauty but simply of embodying vital and significant feelings) can a wholesome and natural attitude of appreciation finally be secured.

3. The social, or communicable, character of the emotions from which æsthetic expression naturally springs, emphasizes the values of joint experiences and actions of a more or less domestic nature. Group activity of a joyous character celebrating some event or fact of common value is the natural soil of artistic creation in the school as well as out.

4. Expressive activity is also especially adapted for educational use in that the separation, so usual with adults, between the utilitarian and the artistic does not naturally exist for them. In the absence of economic pressure, the measure of use is simply value contributed to the enhancement of individual and group life. Cooking, even such seemingly utilitarian things as setting a table and serving a meal, easily take on for children an artistic value so far as they represent a consciousness and commemoration of things to which children attach a vague social significance, all the more potent because in its vagueness it represents the mysterious and attractive world of adult life. The separation of the externally and technically useful from emotional and imaginative enrichment is unnatural psychological divorce, and one of the chief functions of the arts in education is to maintain the natural union of the socially important with that which makes strong emotional appeal.

5. Literature is probably the art most generally available for school purposes. In order that it may be a genuine art it is necessary that it be presented as a consummation and perfecting of factors which the child already appreciates as having value. This means that it is not so much a point of departure for instruction as it is a focus in which other factors gather together in a vivid and ordered way. Literature is not to be used as a means for any other end than this gathering together, in a vital and readily appreciated way, of scattered and inchoate elements of experience. It is not, for example, to be made a means of moral instruction or consciously impressing a specific moral lesson. It is ethically important simply because it presents in a form easily grasped and likely to be enduring values which are themselves felt to be intrinsically important. Any attempt at definite formulation and impressing of these values and the kind of conduct they require is certainly detrimental to the literature as art, and is very likely to be harmful to the moral influence which the values might exercise, if left undisturbed in their proper medium of feeling and imagination. The same principle holds, of course, of methods that utilize literature simply as a means of teaching grammar, information about the history of literary men, antiquities, or any of the diverse

topics which have been hung upon literature as upon a peg. J. D.

See Activity; Art in the Schools; Art, Methods of Teaching; Course of Study, Theory of; Design; Drawing; Dancing; Occupations; Primitive Society, Education in.

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ART IN THE SCHOOLS. — Historical Development. — Free-hand drawing as an element in education has been advocated since the time of Aristotle, who included it among his subjects of instruction. It appeared, however, neither in the *Trivium* nor the *Quadrivium* of later schoolmen, and is not recognized as an important element of study until we reach the educational reformers of modern times. Comenius recommends it strongly, as does Locke, who would have the child taught to draw after he has learned to write. Rousseau and Pestalozzi both advocate it, the former for the skill it gives, and the latter, with keener insight, for its effect upon the taste of the worker. Beside drawing in the flat, Pestalozzi would have the child study representation in three dimensions through modeling in clay. His suggestions were amplified and developed by Froebel, who in his Kindergarten made drawing and all forms of representative handwork play an important part.

In recent times the subject has come to occupy a prominent place in the curriculum of the elementary school. Reasons physiologic as well as pedagogic and economic are urged for its teaching. It is presented as an instinctive expression of the child, one which permits his motor activities to be exercised and trained. It is the most generally advocated form of manual work, and in recent years has come to be considered as the most fundamental of vocational subjects. Its value as an æsthetic agent in education is especially emphasized in the United States.

The industrial argument for drawing is based on economic reasons. Up to the middle of the nineteenth century the usual education of the artisan included an apprenticeship in which the drawing of his trade formed an essential part. The development of modern factory processes, with the enormous increase in the use of machinery, has caused the older trades to be divided and subdivided and the apprenticeship system practically to disappear. With this disappearance there has risen, of necessity, a demand that the elements of industrial drawing be taught in the public schools. This demand first made itself felt in the great manufacturing centers on the Continent and in England, later in America, and in 1870 it formed the chief argument which led to the introduction of drawing into Massachusetts, first of the states to require this teaching.

In the first quarter of the nineteenth century Prussia developed a scheme of elementary teaching which soon came to be widely quoted. A little later this was followed by action of the English Parliament looking to the establishment of a national school of design. This school was opened in 1837, and in 1841 was extended through branch schools, with annual state grants, into various of the manufacturing districts of the kingdom. A simultaneous development of industrial art education took place in Denmark, France, and Austria, but it was not until 1851 that the subject came, through the International Exhibition in London, to attract profound attention from economists and educators. This exhibition placed before the world at large the comparative excellence of the art manufactures of the different Continental states and showed the great importance of art training for the artisan.

England immediately set about reorganizing her national school, and, as the South Kensington system, made one of the first moves of the new institution a department for the training of art teachers for the elementary schools. A coincident development took place in the industrial art movement everywhere upon the Continent. This led to the multiplication of schools of industrial art for a great variety of trades, and to a considerable increase in the attention to drawing in the elementary curriculum.

In the United States, as has been noted, drawing first made its public school appearance at the industrial centers. In 1812 William Bently Fowle, headmaster of a Boston public school, introduced it as a required study, and shortly thereafter translated for the use of teachers an elementary work published in France, on the drawing of geometric figures. In 1827 the subject was introduced into the English High School in Boston, where until 1836 it remained an optional study. Not, however, until 1853 was a special teacher assigned to the subject. Philadelphia, in 1842, appointed one of its leading artists, Rembrant Peale, to supervise drawing in its public schools; and various other cities, after this date, introduced it in some form or other. In most cases it was in the high school that it appeared and was generally offered as training in the making of geometric figures and highly conventional patterns.

The great manufacturing state of Massachusetts, feeling the industrial importance of the subject, in 1860 included it as a permissive topic in the curriculum, and ten years later made the subject mandatory.

The rapid development of the subject under the new statute is indicated by the fact that, while there is no reference to drawing in the report of the state board for 1868, the year following the adoption of the statute, 1871, saw extracts referring to it from the reports of superintendents of 45 towns. With the adoption of the statute referred to, Massachusetts employed a director of industrial art in the person of Walter Smith. The latter was a teacher from England who had been trained at South Kensington; and one of his first efforts was to develop a scheme of training of grade teachers in the city of Boston and throughout the state. In 1873 the state organized a normal school for the training of art teachers. This has since graduated several hundred students, and has influenced the development of normal art departments in many other institutions. It still remains the one state school in the country devoted entirely to normal art teaching.

The effect of the International Exhibition in London in 1851 was to rouse in many ways an interest in art throughout the kingdom. Each of the great international fairs held since has operated to develop critical comparisons between the work of national systems of art instruction. In the United States the Centennial Exhibition of 1876 served to quicken general interest, no less than twelve large art schools being organized in the first half of the decade succeeding the Philadelphia Exposition. These comparative exhibitions of work have served as clearing houses for the exchange of ideas, and to a large extent have led to a considerable degree of unification in the general approach to drawing.

As taught in the elementary school, the early drawing both on the Continent and in America was marked by formality of approach. The subject was primarily regarded as a motor drill, and practically no opportunity was given for self-expression. Schoolmasters influenced by the three R's were slow to admit that it had any value other than a disciplinary one, though some agreed that it might be an aid to penmanship. The exercises chiefly consisted of geometric figures on cards, set for reproduction, like the written copies of the writing master. An advance was later made in offering pictures in outline and in light and shade. These also were offered as copies. Little, if any, work was done from actual models, and the only really practical part played by the subject was in the making of maps.

Influences of Child Study. — Drawing appeared as one of the most essential forms of motor work in the Froebelian practice, but even in the freer air of the kindergarten it retained much of the formality referred to. It remained for a new generation to undertake a careful study of children's interests and of their developments, with a view to determining, as regards drawing, both the nature of the subject matter and the method of its teaching in the different school years.

This study of children incident to the general development of genetic psychology has served, particularly in America, to introduce a large degree of personal freedom and of personal experience into the work of the drawing course. A number of trained investigators have recorded their observations in monographs. These include, among others, the studies of Passy and Compayré, Binet and Perez in France, Goetze, Pappenheim, Levenstein, and Kerschensteiner in Germany, Ricci in Italy, Cook, Rooper, and Partridge in England, Barnes, Lukens, Maitland, O'Shea, and Shinn in America.

The general trend of these investigations has served to emphasize the child's desire to work in color and to use drawing as a direct means of expression intimately akin to speech. Practically no æsthetic interest has been found in the early years, though it appears as a marked characteristic of adolescence. The spontaneous drawings of children are pictorial. Decoration as such for the younger children has only a secondary interest, chiefly in the pleasure of rhythmic repetitions. Living things and those connected with the child's life are the most attractive. The young child elects to draw from memory rather than from the object, and to use his drawing as a means of telling a story.

In the latter part of the elementary school period, from 9 to 14, profound changes take place, both in the body and mind of the child. In this pre-pubertal age childhood makes its first advance toward youth, and the learner becomes willing to undertake systematic practice to cultivate his manual skill. If the finer muscular coördinations are not acquired at this time, they become difficult of development in later life. As adolescence progresses, general ideas become attractive and the children are more interested in the abstract in both form and decoration. Their critical sense becomes far keener, and their interest in nature and art experiences a marked increase.

Present Position. — The result of the studies referred to has been to alter the presentation of drawing in both the elementary and intermediate schools. The systems of the Continent have reflected the change somewhat more slowly than the English and American courses, but for the most part there has been a considerable advance through all schools toward the more natural use of drawing as a means of expression by the young child. The use of the formal geometric copy has very largely disappeared. Color has been widely introduced, and much work in the making of pictorial illustrations is encouraged on the part of the small children in all the more advanced Austrian, German, and American schools. The use of natural objects has taken the place of the outline drawing card, and drawing from forms of three dimensions are now called for in the early lessons. With increasing industrial development there has been a coincident demand that the drawing of the higher grades relate itself as nearly as possible to the vocational needs of the pupils. The teaching of plan and instrumental drawing has been widely introduced, especially in the German schools, while instruction in applied design in color is coming to occupy very considerable attention in both American and Continental systems. At the present time changes in the teaching of the latter subject are still much in the making, and any exhibition of work from a number of cities will show steps in the transition all the way from mechanically devised ornaments as developed in the drawing books of the early seventies to original and individual examples of applied pattern in various forms of craft work.

In 1900 a group of art teachers representing a number of countries met at Paris at the International Exhibition, and organized an International Society for the development of art teaching. A small international exhibition was held at Berne by the association in 1904, and an extended exhibition representing 37 countries in London in 1908. Nearly 2000 members were registered at the latter meeting. The work shown illustrated the art teaching from the infant classes through the normal, industrial, and fine art schools of each nation.

A comparative study of the work of the elementary schools showed greater precision and formality in the teaching of the Continental instructors, and greater freedom and individuality in the work of the American cities. The American scheme of study was as a whole the more elaborate, carrying forward various forms of work, illustration, nature drawing, landscape, still life, applied design, from the lower to the higher grades. Few of the Continental cities showed work from elementary schools in applied decoration, but the work from simple objects in the flat, leaves, feathers, shells, insects, etc., reached high standards of technical excellence. Particular attention was seen to be given in the German schools to the use of free-hand sketching, in connection with a variety of other subjects, as nature study, physics, physiology, and local maps and plan drawing.

Germany. — The later drawing of the German schools bears traces of the earlier " systems " which developed in different cities under strong directors. The so-called Prussian system organized by Stuhlmann at Hamburg carried the pupil through a series of geometric ornamental forms beginning with drawing on net lines. It ended with the perspective drawing of solids. Instruments were constantly employed, and the models, as originally presented, were very formal in character — blocks, moldings, etc. In contrast with the Prussian system was the so-called Leipzig plan developed under Flinzer. This discarded all net lines, and began with free-hand work. Thus it continued through the entire course, drawing from solids being undertaken in the third grade. The plan in the Westphalia schools included drawing from three-dimension forms in the lower grades. Mention should also be made of the Munich plan recently developed by Kerschensteiner. This places much emphasis on decorative brush work in primitive geometric style, and on imaginative drawing on the part of the smaller children. It develops a different syllabus for boys and girls in the primary schools, and places stress on the early teaching of memory drawing following class discussion. Drawing from nature is introduced about the age of 10. The scheme as a whole is based on an elaborate study made in the Bavarian schools by the superintendent of Munich. While drawing in the German elementary schools receives careful attention, one must look to the industrial schools to find it in its most significant form. A very large number of these institutions have within the last 50 years been created throughout Germany. In all of them industrial drawing forms one of the most important elements of the curriculum. For the most part this drawing is highly specialized and deals with the particular type of work most essential to success in the industry for which the school prepares, that is, with drawing for machinists, for carvers, jewelers, sign-painters, etc. Instrumental or plan drawing in these schools is universal, and the equipments are noteworthy for their elaborate models.

Switzerland. — Other of the Continental governments have created schools on similar lines. Switzerland, for example, makes drawing compulsory in the elementary schools, where the work is taught by the class teacher. The higher grades give 2 hours a week to free-hand drawing and 2 hours a week to instrumental drawing. For older pupils there are very completely organized technical and art and craft schools in Berne, Lucerne, Geneva, and other industrial centers. The work of the industrial art school of Zurich has become widely known through its technical excellence.

England. — The development of these industrial art schools upon the Continent has been paralleled by a number of the larger cities of England and Scotland. Each of these municipalities has a more or less complete elementary school course from the first to the seventh standard, covering the years between 7 and 14. A kindergarten or infant school course precedes this. The work in the lower classes is largely free, and in the more highly developed systems, as at Leicester, about half the school time is reported to be given to drawing and manual training. In the elementary grades or standards some 3 hours a week are given to drawing, with from 1 to 2½ hours additional for handwork. The class teachers give the instruction, and normal art methods form a required study in the training schools. The work in the elementary schools is designed to lead forward talented pupils to the municipal art school. Sometimes, as in Leicester, Bradford, Birmingham, or Leeds, this is one large central institution with a great variety of classes in all forms of industrial art; sometimes, as in London, many separate art centers are developed. Some of these are special, as the photo-engraving school of Fleet Street, but many have varied courses, as the Camden School of Art, the Central School of Arts and Crafts, the Hammersmith School of Arts and Crafts, and the Camberwell School of Arts and Crafts, etc. In these industrial art schools, teachers of high technical training are employed, and drawings, designs, and craft work of marked merit are produced. England's national scheme of art training has its center at South Kensington. Here appears the Royal College of Art, established for the training of art teachers and for the instruction of students in fine arts, architecture, manufactures, and decoration. It is primarily intended for the unusually talented workers who have been trained in local schools and who are selected by a competitive examination for admission to the college. The latter has 4 schools, one of architecture, one of ornament, a school of decorative painting, and one of sculpture. A number of craft classes supplement the school of ornament, and valuable scholarships make possible the thorough education of the more gifted pupils. At South Kensington the Board of Education annually holds a national competition. This is for the awards of numerous prizes for a large number of projects which are offered for graphic solution. The report of the competition for 1908 noted nearly 14,000 works submitted from 236 schools of art throughout the kingdom. In addition 833 were submitted from 58 science schools, 970 from 114 art evening schools and day classes, and 93 from 3 technical institutions. Elaborately illustrated reports of these competitions indicate the high order of excellence of the work of the prize winners.

America. — Art education in the United States has of necessity no central organization similar to that of South Kensington. Many individual states, following the example of Massachusetts, have directed that drawing be taught in the schools throughout the state, but only two states, Massachusetts and New York, have state directors of the subject. For the most part, the development of the topic has been left to the initiative of the school officers of the cities and local communities. Considerable variations in the time given and the subject studied are therefore to be found.

The usual organization includes a supervising teacher who lays out and directs the work of the grade teachers. Many rural schools, however, have not the advantage of such expert direction, and are either obliged to have recourse to drawing books or to omit the subject. In the smaller towns the supervisor, generally a woman, teaches in the high school. The larger systems have a separate teacher in this school, and in some of the greater cities 4 or 5 art instructors in one building. In these cities numerous assistant supervisors are employed, New York City leading, with over 50 of these district directors.

The time given varies much in different cities. San Francisco, Albany, Detroit, and a few others give 1 hour a week in all grades. Many other towns report 1½ hours to drawing, while others relate the drawing and manual work so closely that the time for each is not indicated. Thus Philadelphia requires 100 minutes per week for drawing and constructive work in the first 4 years, and 120 minutes in the last 4. New York has 2 hours a week for the manual arts in the first 3 years, increasing through the higher years until 2¾ hours are given in the seventh and eighth grades. Boston records the largest proportion of time of any city. It devotes 2½ hours to the manual arts in the first year, 3 hours from the second through the fifth, and 5 hours a week in the sixth, seventh, and eighth years. Many of these cities issue elaborate outlines of study, illustrated in some cases with scores of drawings. These courses, as a rule, present 4 different topics — illustrative or pictorial drawing, representative or object drawing, applied design, and instrumental or working drawing. An additional subject in the form of picture study frequently appears. This is offered with the view of developing the pupil's sense of appreciation of pictorial art and of acquainting him with the work of the more famous painters.

As has been noted, there appears throughout the American system a progressive tendency to unite the drawing and the manual training or constructive work into a coördinate whole. Certain cities therefore offer their work in the "manual arts" rather than in drawing and in handwork. The plan generally followed leaves to the first 4 years, or the so-called primary grades, the greater part of the illustrative drawing. With this is associated the first steps in object drawing and simple constructive work in paper, clay, raffia, cord, etc. There is a marked trend toward developing these different subjects around "centers of interest" related to the language, nature work, and other studies of the grade. Much of the work is done in color, chalk, crayon, or water-color paints being employed. The illustrative drawing develops pictures of scenes dealing with the various topics studied, while the representative work is done largely from the model. Flowers, vegetables, toys, and simple objects are employed. The chief aim of the earlier work may be defined as an effort to induce the pupils to use their drawing freely and in spirited and individual fashion, to lead to an increasing refinement of muscular coördination, and to waken a definite interest in form and color.

The work of the grades from the fourth

through the eighth year sees the introduction of applied design. With the increase of the critical faculty the illustrative drawing becomes less valuable and the study of decoration of more service. The designs are commonly developed in color, and for the most part are applied to constructed forms made in cardboard, leather, wood, etc. In many systems a considerable amount of elementary craft work is done in the form of stenciling, block printing, leather tooling, etc. This offers additional opportunities for the application of pattern. Representative drawing in the upper grades is done from a large variety of simple models, sometimes in light and shade, but more often in drawings in colored crayon or chalk, or in pencil outline. The working drawing taught in these grades includes simple plans, and requires the use of drawing board, compasses, and triangles. Where, as in many cases, elementary shopwork is taught to these boys, the latter drawing is used to develop the required plans for the shop. The girls of related classes study either sewing or cooking, and are often required to learn garment drafting in place of the instrumental drawing taught to boys. Throughout the upper years many drawing outlines offer specific suggestions relative to training in art appreciation. Well-known pictures are presented for study, a number of business firms supplying for this purpose small and inexpensive reproductions of masterpieces. Where this work is done it is generally associated with the language teaching. In the high schools there is a marked tendency to make this training in art appreciation of first importance. The earlier teaching was characterized by an effort to reproduce the atmosphere of the art school. Much work was done in drawing from the cast and in more or less elaborate studies of the antique. The earlier high schools that required drawing were few and far between. Even at the present time the subject is only to be found in the larger cities and in well-organized rural systems. In Massachusetts as late as 1903, 105 of the 244 high schools gave no attention to drawing. Since then many of these schools have introduced it, and it has been made a required element in the high school curriculum of the state of New York.

The change in approach to drawing in the high school has been of a nature similar to that in the grades. It has been realized that few of the pupils in these schools can become artists, and that the aim of such training should rather be to help the many to see their study in art as something of much value to them in their everyday life. This effort to make the work more alive and appealing has turned the course from the older studio "cast drawing" toward work in applied design. The movement is one which aims to lead the pupil to see that art must exist in good form or bad, in his dress, his home, and in the town in which he lives. It assumes that taste is a subject which can be taught, and strives to teach it, not by talking about it, but through the effort to create fine patterns for hangings, simple forms for jewels, simpler decorations for dress, and a great variety of objects which may be developed through the minor crafts.

Differentiation of high school courses has already in the larger cities led to highly specialized work in drawing of a vocational nature. Thus commercial high schools offer courses which lay emphasis on commercial design, printing, and composition, while manual training high schools place major weight on instrumental drawing and constructive design. A few other schools of a technical nature offer opportunity to their pupils to specialize in art and to devote as much as half of the school time in the higher years to forms of industrial drawing and design. In these institutions technical standards are being raised to approach the highly developed work of the Continent. The general high school system in America is not organized on lines similar to those of secondary schools in Europe. The difference appears clearly in the aim of the art teaching, the emphasis being rather upon the technical side in Continental institutions and upon the æsthetic side in schools in the United States. Technique in the latter schools is by no means ignored, but it is generally assumed that few of the pupils will ever become technicians, and that the comparatively little time given to the subject of drawing should be directed so far as possible to raising the pupil's appreciation and sharpening his critical sense for fine form, harmonious color, and appropriate decoration. One of the elements prejudicing the early development of drawing in high schools was the refusal of college authorities to accept it as a subject for credit on examination for admission. Within recent years a number of the leading universities have permitted drawing to be offered on entrance, and a few have made it a required subject for technical, engineering, fine arts, and architectural courses.

Municipal industrial art schools of the type common in all the larger European cities are as yet rare in the United States. Nearly every city of any size can boast some school giving industrial art training, but for the most part these schools are under private foundations. The great majority of them see the industrial art work as but one, and often a minor phase of work, while the school devotes its chief attention to its fine and normal art courses.

The growth of institutions for the training of art teachers has been considerable. Massachusetts, as was noted, organized, in 1870, the first and only state school whose sole purpose is to educate teachers of art. More than 50 schools now offer normal art courses of from 1 to 4 years, while the state normal schools (for the general training of teachers) commonly present some work in methods of art teaching to their students. Supplementing the work of the normal art schools there has developed, largely within the last decade, a system of summer art schools, where brief courses are given in methods and in the arts and crafts. These are designed for the instruction of art supervisors and teachers from the grades. The larger number of these schools are connected with colleges and art institutions which offer extended courses in the winter sessions.

There are numerous professional organizations of drawing teachers both in Europe and America. England has an Art Teachers' Guild and London an Association of Art Masters. In Scotland there is also an Art Teachers' Association at Dundee and Hamilton. All of these associations, together with those in the United States, are represented in the International Association of Art Teachers. The earliest association of art teachers in the United States was organized in 1874 by students of the Massachusetts Normal Art School. At the present time three interstate associations hold annual meetings, the papers of which are published in volumes of transactions. All of these societies, through the intimacy of relation which has grown up between art and handwork, exist as Associations of Art and Manual Training Teachers. The Eastern draws its membership from the Atlantic seaboard, the Western from the Middle states, and the Pacific from west of the Rocky Mountains.

The National Education Association also has its Department of Art and Manual Training, which meets annually in connection with the general association. For the past nine years the Council of Supervisors of the Manual Arts has issued a Year Book containing the studies of its members. In a large number of states there are to be found local art societies meeting as a rule with the State Teachers' Association. The literature issued by these various organizations is now considerable. It offers the best source in which to study the aim and ideals of the American art teachers. J. P. H.

See Æsthetics; Art in Education; Art, Methods of Teaching; Course of Study, Theory of; Design; Drawing.

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It is to be noted that practically all the large cities in the United States and England publish their art courses of study for the public schools; various cities and localities on the Continent do the same.

ART, METHODS OF TEACHING.— Methods of teaching art depend upon the conception of art held and upon the purposes for which the subject is introduced into the curriculum. If the purpose is to interest the pupil in nature or to develop the power of observation, or the power of coördinating ideas and hand manipulation, as is often stated, no strictly æsthetic purpose is involved, and a type of method wholly different from those adopted for the development of artistic appreciation is appropriate. Again the conception of art, whether it is imitation of nature or the expression of harmonies of form, tone, and color, has a deciding influence on the type of method adopted.

Individuals vary and modify the details of their methods of teaching, but all art instruction can be classified under two heads according to the point of view and the principles involved. These systems are radically different in character, affecting the entire makeup and conduct of courses of study. They are, respectively, the academic (analytic), the structural (synthetic). The academic method is a reflection of the professional art school. Its origin may be traced to the later Renaissance. The method is traditional and scientific, making the acquirement of knowledge of nature's facts the first step and the foundation of all progress. The pupil learns to draw, but defers expression until he has attained proficiency in representation. The process is imitative, and the standard external. The structural is a return to the natural method of pre-academic days. It was the method practiced in Europe from ancient times down to the Renaissance, and is still used by the Orientals and by all who are independent of scientific domination. The approach is through structure — the building up of harmonies of shape, tone, and color — and the purpose is the development of power in the individual. Self-expression begins at once, involving all forms of drawing, and leading to appreciation. The process is creative, and the standard is individual judgment as to fine relations.

The academic method is truly analytic, teaching the pupils "to see," to gather fact upon fact, to store up knowledge, to acquire skill. Its analogue is the old way of teaching language through grammar, rather than through use of the language. Self-expression in terms of line, tone, and color is deferred, and appreciation is only a by-product. It brings about a somewhat sentimental view of external nature as the source of all art. Whistler's remark that "nature is seldom right" was a blow at this false standard. Critics of the academic school must refer all excellence to nature. For example, they interpret Greek art in terms of fact — making the study of the bodies of athletes the source of artistic power. They measure Japanese art, not by quality, but by truth and perspective. This imitative and scientific system is derived from the eighteenth-century academies and is being followed in our modern academies of art. It owes its origin to the late Renaissance, when creative power was feeble and interest in the sciences dominant. Because one of the greatest of all artists, Leonardo da Vinci, was possessed of boundless curiosity and sought the secret of nature with toilsome persistency, his followers concluded that the pursuit of truth was the basis of art study. Leonardo himself, like all the masters of the Renaissance, was trained by apprenticeship — in fact, by a structural method — to strive for quality and mystery and power in expression. His genius controlled his scientific instruction, and he built all his knowledge into his art fabric.

Continuing the traditional scientific scheme, the academic method in these days requires that schools and courses of instruction be highly specialized. The relation of object drawing, cast drawing, light and shade work, and still-life painting to mural decoration, house furnishing, costume, handicraft, and the industries is not very clear. It is often forced — for example, the naturalistic flowers in full modeling repeated over wall paper, carpets, and china with no reference whatever to any principle of design. The processes and subjects of academic teaching are good in themselves, but the emphasis is in the wrong place. The tendency is to make art in schools either a pretty accomplishment or an adjunct to some business pursuit.

The structural method disregards the theories of the eighteenth-century academicians, and ignores their division of the subject into representative and decorative art. Instead of setting up external nature as the standard, the action of the human mind in harmony-building becomes the foundation for study. The elements of space art are shape, tone, and color, the whole visible world being revealed in these terms. Education in space art follows the analogy of music and literature — beginning with structures of a simple order — a few lines, a few sounds, a few words — and proceeding onward by steady growth. Rhythm, subordination, symmetry, proportion, tone values, color schemes are fundamental to all the arts, at least by analogy. From this point of view design, instead of being classed as "decoration," is seen to be the very primer of art. Nature's beauties are cases of accidental harmonic structure, to be copied not as a mere exercise, but because they are beautiful and the study of them increases capacity for appreciation, or because they suggest motives for design.

Synthesis (self-expression) is the center of effort, with the sciences as aids. The fine arts of architecture, painting, and sculpture have been developed from industries, not from nature or the bodies of athletes. The beginning and the end is the relation of forms to spaces, not the copying of anything. Greek art, from its earliest to the best period, is an effort in composition — the purpose being to attain finer and finer relations of line and space. When the artists turned their attention to copying facts (human bodies), Greek art disappeared. The same may be said of Italian art, of textile design, and of Gothic art.

What we call art springs from a desire to make things "look well." The raw materials may be put together in a rude way, for mere use, or may serve a higher use by being put together in a fine way, satisfying a strong desire of human nature. This finer way means ability to make the best choice — and this comes from the trained judgment. The history of art development shows that whenever the workers constantly improved upon proportion, tone, and color there was growth into fine art. The simple process of adapting forms to spaces began with painting on clay bowls and carving the handles of utensils or weapons — and ended in the Greek sculptures, the Gothic cathedral, the mural painting. There was no distinction between art and industry, between representative and decorative.

A course of structural art teaching begins with simple forms of creative work, the pupil drawing upon all nature and all the art of the world for examples. Representation and the sciences become aids to self-expression, rather than preliminary exercises, as under the academic system. There is opportunity for immediate application in industry, handicraft, home decoration and costume.

The structural method of art teaching, though comparatively new in the United States, is not new as a principle. The old system of apprenticeship taught art in practically this form. Art is studied in this way in Japan. The Japanese, however, have introduced the academic system in some of their schools, and the two are conducted side by side. It is significant that designers for the great Japanese industries of lacquer, metal, and textile, are trained by the pure Japanese (synthetic) method. The art of Persia, India, Turkey, China, in fact of the whole Orient, is a higher form of industry, developed without copying nature or historic styles. In the United States the art teaching in professional schools has followed largely the academic method. Normal art courses for the training of teachers have been until recently thoroughly academic, the subjects being object drawing, life drawing, water color painting (still life, figure, landscape), pen and ink, perspective, anatomy, etc. The inadequacy of this and the feeling that art training must be something more than pastime, together with the increased interest in industrial education, have forced synthetic methods into many of the normal schools, adding to the academic courses composition in line, dark-and-light, and color, and studies in art appreciation.

An influential illustration of this type is to be seen in the art work of Teachers College, Columbia University. Here the structural method is adopted, with a 2 years' course (capable of being extended to 4 years) for the training of art teachers, supervisors, designers, craftsmen, painters, and sculptors. The first or junior year is given to general work in principles of design, drawing, painting, modeling, art appreciation, history of art, and psychology; the second or senior year, to special studies of advanced composition, with figures and landscape, painting of figures, still life and landscape, advanced design, house decoration, history of education, theory and practice of teaching art, practice teaching. With these courses are closely associated handwork in the industrial and household arts — wood, metal, pottery, costume design, and house furnishing.

The structural method is now found side by side with the academic in many schools, passing under the name of design (*q.v.*) or composition (*q.v.*).

These two influences are reflected in the art teaching in the public schools, with the academic in the ascendant, though evidently losing ground from year to year. The old rigid copy books and the type forms have given way to nature drawing, mass painting, and illustration. These, however, tending to put art among the pastimes, cannot hold the monopoly. Design with its stimulating application in industry, and the new thought of art teaching as a development of power, have introduced new problems and caused the study of spacing, dark-and-light, and the application in manual training to have more prominence. In the yearly exhibitions of school art the academic influence is seen in mass painting, blotty landscapes in color, dictation exercises in landscape, pose drawing (figures not in action), illustration in crayon, water color, and cut paper. The structural influence appears in designs (for panels, book covers, pages, posters), massing in two and more values, landscape in a few flat tones, illustrations for books, color schemes, pottery, baskets, bookbinding, wood and metal construction, brush drawing, pencil drawing, painting in flat tones, with or without outline. Wood block printing upon textiles and paper was introduced into the Teachers College practice school in 1905, and has since been extensively adopted in elementary and secondary schools, and in art schools, as a method of studying composition of pattern and of making experiments in color harmony.

A. W. D.

See: ART IN THE SCHOOLS; COMPOSITION; DESIGN; DRAWING.

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ART SCHOOLS AND ART INSTRUCTION.— In Europe. — *France.*—In a concise review of the art schools of Europe the first place must justly be accorded to France. That country has been the art center of the world since the displacement of Italy from that position, when the Renaissance movement had lost its vitality in the peninsula. Throughout all vicissitudes, political and religious, which at times have amounted to cataclysms and have occasioned temporary chaos, France has preserved her art impulse, and immediately upon the institution of a new order of things, she has proceeded to a new artistic expression, indicative of changed conditions, yet always distinctly national.

To begin with France is also the natural manner of procedure, since the interest of a large body of enlightened Americans centers in the *École des Beaux-Arts,* or in the *ateliers* of Paris.

The first-named institution, whose title appears to lose something of its meaning when translated into English as "School of Fine Arts," is the oldest foundation of its kind existing north of the Alps. It owes its inception to Cardinal Mazarin, who, in 1648, organized it as a school of painting and sculpture, modeled, as to general features, upon the academies of Rome, Bologna, and Florence; while that other great minister, Colbert, who was a wise patron of the fine arts and a most farseeing economist, created, in 1671, a school of architecture, thus completing one of the most durable administrative triumphs of the long, brilliant reign of Louis the Fourteenth. The initiative of France was followed by the foundation of the Academy of Berlin in 1694, and by that of the Royal Academy of London in 1766, these dates showing that the *Académies des Beaux-Arts* of France were already somewhat advanced upon their civilizing mission at the time when the first art schools of the eastern and the northern neighbors of that country were entering upon their existence. It is, also, interesting to note in passing that the academies of France early extended their influence to America; since scarcely had the independence of the colonies been assured, when the municipal council of Boston proposed to send a commission to examine them with a view to founding a similar institution.

The Revolution of 1789–1793 suppressed all existing academies of art, science, and literature in France, to replace them, after a short interval, by a composite body known as the *Institut National,* two sections of which, the Academy of Painting and Sculpture founded by Mazarin, and the Academy of Architecture founded by Colbert, were finally united in 1816, the year following the fall of Napoleon and the restoration of the Bourbon dynasty.

From this moment the real *École des Beaux-Arts* dates its existence, although in 1863 it submitted to a radical change in administration effected by M. de Nieuwerkerke, a minister of Napoleon Third, who, after an exciting struggle maintained by parliamentarians and publicists, succeeded in depriving the school of the authority to rule itself, and in placing it under the direction of the French government. Since this crisis the changes in the school have been solely those of evolution, such as the establishment of new professorships and of courses of "simultaneous," that is, of theoretic studies; also, the admission of women, the first examination leading to this contested departure from old restrictions having occurred in the Section of Drawing and Painting, in June, 1897, when out of 42 candidates who presented themselves, 10 were received as students. For foreigners the main interest of the *École des Beaux-Arts* has long centered in the Section or School of Architecture, which, in spite of steady criticism directed against it from more or less powerful sources, yet ranks, beyond all doubt, as the first in the world. (See Architectural Education.)

Regarding the value of the training offered by this most important section of the school, there have been and will continue to be the most varying opinions expressed in the United States. But the discussion, when reduced to its lowest terms, would appear to be based on the natural opposition existing between Latin and Teutonic methods; between highly developed organization on the one side, and strong individualism on the other. And one who disinterestedly examines the question at issue cannot do otherwise than acknowledge advantages: in the federated system of *ateliers* which make up the school; in the teaching of design by practicing architects of the highest distinction, who are paid for their services almost wholly by the honor attaching to their professorships; in the division of the students into *anciens* and *nouveaux,* the former of whom criticize the work and aid in the studies of the latter, thereby effecting the perfect unity of the student body, which is a first essential of success in an educational institution. Furthermore, the long life of the school is in itself a proof of its very positive value. It has had an existence of more than two and a half centuries; for the Revolution of 1789 did not interrupt the continuity of its traditions. It stands, therefore, as an example of the law of the survival of the fittest, as do consequently the methods which it professes, since these are the outcome of generation after generation of the best thought and experience of able architects. The principles of natural selection are as incontrovertible in art as in nature, and nowhere in the domain of the former are they better set forth than in the present strong vitality of the School of Architecture of the *Beaux-Arts.* Nor are the main results of the training given in this school, as some critics would have them to be, a series of formulæ, a command of certain architectural forms, a narrow, bigoted belief in certain styles. On the contrary, these results, even if judged in a restricted sense, that is, by the life work of the serious American students of the school, appear to be: rational methods of attacking and of studying all problems presented; clear expression of the plan in the elevation; high development of the qualities of dignity, beauty, and refinement. In support of these statements we have but to turn to the Public Libraries of Boston and New York, to the National Academy of Design and the Tribune Building in the latter city, to superb domestic types like the residence of George Vanderbilt, at Asheville, N. C., and having impartially studied them, we must conclude that the School of Architecture of the *Beaux-Arts* is a fountainhead of good doctrine; furthermore, that schools of this nature serve to unify one generation with another, and that it is only the few creative geniuses sweeping, like meteors, the heavens of art, who can afford to neglect severe academic training.

As to the Section of Drawing and Painting of the *École des Beaux-Arts,* they have less interest for American readers, since the majority of the students of these arts from our country elect to work in some one of the private academies, or *ateliers,* there paying moderate rates of tuition, rather than to seek entrance into the government schools, where in all branches the instruction is free to all comers. One of these academies, now known as the Colarossi, under its former name of *Académie Suisse,* dates its existence from 1816; while the noted *Académie Julian*, named from its founder, who was a man of artistic and administrative ability, and withal a finished French gentleman, was opened a half century later, with a registration of only 20 persons, but expanded rapidly, until shortly before the death of M. Julian, which occurred in 1905, it numbered 1000 students, 300 or 400 of whom were women; the latter occupying exclusively 3 out of the 5 working studios of which the academy was then composed. To-day, governed by a nephew of its first director, who also bears the same surname, the organization continues its activities, apparently without loss of numbers. Another important institution of a similar character, taking its name from that of the old street of the Latin quarter, *La Grande Chaumière* in which it is situated, also attracts large numbers of foreign students. These academies usually hold three sessions per day, and offer *concours* or competitions, at stated intervals, during the winter months; while, during the remainder of the year, the students may work without such impetus, under the criticism of celebrated artists who regularly visit the *ateliers*.

The unsurpassed instruction thus provided at the maximum annual cost of 400 francs for men, and of 700 for women, constitutes the chief value of such academies for the earnest student; but the excellence, variety, and constant attendance of the models there employed, attract experienced artists who, by taking advantage of these courses, are able to reduce one of their largest and most necessary expenses.

Passing from the schools of Paris offering instruction in the fine arts, strictly speaking, to those devoted to the decorative and applied arts, the origin of the movement responsible for the creation of the institutions of the latter class must be briefly indicated. While certain critics attribute the revival of the minor arts, which occurred in the latter half of the nineteenth century, exclusively to English influence, it must be admitted that the French impetus was national and due to Viollet-le-Duc, the great French architect and writer. His championship of the Gothic led to his retirement from the *École des Beaux-Arts*, and to the foundation by him of a special school which, as an exponent of the medieval system, directed attention to the so-called arts and crafts and to all design in which plant forms play an important part. As a result having its first and partially hidden cause in the influence just described, there is the School of Decorative Arts subventioned by the French government, and now under the direction of M. Louvrier de Lajollaye.

Another institution worthy of remark is the school founded by M. Guérin, sometime official architect of the City of Paris, in consequence of a decree issued by the French government to the effect that a certificate of proficiency be demanded from all drawing masters teaching in the national colleges. Courses in draughtsmanship, perspective, and decorative art are here offered under such noted masters as M. Guérin himself, Luc Olivier Merson, and Eugène Grasset, the last of whom is very widely known abroad from his encyclopedic work entitled *The Plant.* The curriculum of this school reaches through a period of 3 years, during the first of which the pupil composes designs from rectilinear and curvilinear elements, thence passing to the study of plant forms, and, in his third year, using landscape, animals, and the human figure as portions of decorative design. The criticism which may be offered regarding this school is that its fine theoretical instruction lacks the complement of the practical element; that it needs technical workshops wherein the designer might learn the possibilities and the limitations of various mediums, and so acquire that integral education, as a result of which the brain and the hand work together in harmony.

Another and much newer form of art instruction in France, the purpose of which is not the development of experts, but the elevation of the people, is due to a body calling itself the *Société Nationale de l'Art à l'École*, founded in 1907, whose constitution is given at length in one of the monthly issues of the *Encyclopédie Larousse.* This society, recognizing the educative, moral, and economic value of art, as a factor tending to facilitate and to beautify life among the masses, aims not only to afford instruction adapted to further the end just stated, but also to provide primary school buildings, the situation, construction, and decoration of which shall improve the health, as well as develop the minds and the taste of the children thereupon attendant. This society, as described in the report given in *Larousse*, consists of thirty sections having seats in the principal cities of the country, and it offers an example of the strong centralization so characteristic of all schemes devised by the French mind. It testifies also to the anxiety which has been awakened in the hearts of the wisest among the nations as to the necessity of action and foresight, if France is to maintain her importance, rather than fall a victim to that somewhat vague malady indicated by certain sociologists under the name of Latin decadence.

But however present tendencies may be regarded, it must be granted that the descendants of those races who peopled the southern peninsulas of Europe possess the highest gifts in the arts of form; while the Germanic and Celtic bodies have shown in these arts assimilative, rather than creative qualities.

England. — The Royal Academy of Arts in London was founded in 1766, more than a century after Cardinal Mazarin had organized the nucleus which was to result in the *École des Beaux-Arts.* Unlike those of its French forerunner, the schools of the English academy have trained almost exclusively native students, and from them as a center propaganda have not gone out to cause discussion abroad. They have been largely insular in their influence; they possess no great department of architecture, and no *Prix de Rome* is fixed as their great award, although traveling scholarships are granted biennally by the administration for excellence in the several fine arts. These schools are most liberally organized as to entrance standards of general attainments, and as to age limitations. To them applicants, after a preliminary technical test, quite elementary in character, are admitted as probationers for three months, and, the required work of this period being successfully accomplished, the probationers become regular students to whom the privileges of the school are open for seven years without fees for instruction from the first artists of the kingdom.

While the Royal Academy thus stands for all that is formal in English art, the school at South Kensington, since it owes its creation to a very modern impulse, follows in its administration the trend of the times. As early as 1857, the seat of a governmental Commission of Arts and Sciences was fixed at South Kensington, and this body, recognizing that instruction in decorative art is of the highest economic value, proceeded to emphasize this study in the curriculum of the new school, with the result that, ten or twelve years later, textile designs were purchased by a French manufacturer from students at South Kensington. This occurrence was but the beginning of the gradual change of old conditions under which English industries purchased their designs from French artists; while, at the present time, side by side with the beautiful fabrics of domestic design, Parisian shops display the distinctive work of rivals from beyond the Channel.

The school at South Kensington, known officially as the Royal College of Art, offers courses in drawing, painting, modeling, and designing for architecture, manufactures, and decoration. Having as its primary purpose the instruction of art masters and mistresses, and of students selected by competition in the art exhibitions of the Board of Education, the school admits other applicants upon the payment of a fee of 12 pounds 10 shillings per term, and to the number permitted by the space at disposal. Such students numbered 150 at the last obtainable report. The existence of this institution marks a period in the art history of the United Kingdom, since at the time of its foundation but 55,000 persons were receiving art instruction within the limits named; while now they have risen to nearly 3,000,000. Furthermore, the value of South Kensington as a producer of national wealth is recognized by the enlightened portion of the English people, and the director, Sir Caspar Purdon Clarke, who framed the policy to which much of the success attending the enterprise is due, was knighted by Queen Victoria for his services to the Crown, and until recently was the Director of the Metropolitan Museum of New York City.

A fruitful effort to use art as a factor in the general development of the child is now exerted by the Royal Drawing Society, under the presidency of the Princess Louise, Duchess of Argyll. This society was incorporated in 1902, having as its avowed object: " the encouragement of drawing, painting, and modeling in all their branches as a means of education and for developing spontaneous pictorial drawing, painting, and modeling from memory by children." The results obtained by this society were studied and approved by the French Minister of Fine Arts in 1904, and later by the International Congress of Education held at Berne, Switzerland. In 1905 the latter body expressed its sentiments in a resolution adopted to the effect that " it is in the interest of general education to find means to develop the art instinct existing in children, and to determine in what way they conceive a picture according to nature, or imagination, and what method they use in line and color to render from memory their received impressions."

Societies such as the one just described and its French counterpart, *L'Art à l'École*, show an encouraging trend of thought which, to borrow words from the constitution of the French body, argues " the desire to prepare a better future for the generations who are to succeed the men of the present." Nor is it too much to assert that deeply below superficial observation the same impulse animates the strong movement which, within the last forty, and notably the last twenty years has caused the foundation of schools throughout Europe, from Russia to Italy, whose complex purpose is to render life more agreeable by means of beautiful surroundings, to raise the workshop to the dignified place occupied by it in the days of the artisan guilds, and to educate in the same person the brain and the hand, that there may be no waste of energy, time, or money expenditure.

Austria. — One of the most important of such schools, and, at the same time, one whose methods are instructive to study, is located in Vienna, which, like all other European capitals, has its Academy, founded in the eighteenth century, which stands as the exponent of the fine arts, strictly speaking. But the School of the Decorative Arts is also a governmental institution, whose object is to acquire absolute control of the industrial art of the Empire. The means of instruction which it offers are divided into two distinct categories, theoretical and practical; the first represented by the Museum of Art and Industry, and in part by the School of Arts and Crafts; the second, by the School of Textiles, Lace, and Embroidery. The Museum is itself divided into two sections: the permanent, devoted to the preservation of historic and modern masterpieces, and the temporary, including the circulating section, which aims at the instruction of both the public in general and the producers, the latter being invited twice yearly to an exhibition of designs and objects of art. Nor does the Museum confine its work to the capital city, since with Vienna as a center, it has organized 60 provincial and periodic expositions, which last several weeks and are explained to visitors by means of systematic lectures. It purposes, furthermore, to advance industrial art throughout the Empire by the development of technique and the creation of new models. To accomplish the first purpose provincial schools have been founded for the proper direction of the ocal art industries, from which the best pupils are sent to study in Vienna, after acquiring proficiency in their special branch. The attainment of the second object devolves upon a commission of 2 architects and 4 or 5 designers, who are appointed to produce new models; a method of procedure which would appear to be faulty, since, the artist being paid by the government, and the manufacturer being invited to acquire his designs, there results no free and extended competition, which alone gives vitality to art. Furthermore, the Museum, in adopting this plan, first creates designers who must live by their talents, and then prevents these same individuals from finding necessary work. Against this system protests have arisen among the designers who contend that the executants, that is, the manufacturers, are thereby favored to the detriment of the complainants, who are the creators.

Of later establishment than the Museum is the allied School of Arts and Crafts, founded in 1867 by Baron de Myrbach, the object of which is to join theory with practice, teaching with actual production, in order that the pupil, on finishing his course, may go out an irreproachable workman, as well as a thoroughly educated designer. Courses are there offered to both sexes in drawing, modeling, and architecture, and the candidate for admission presents himself at the preparatory school with a drawing of a vase; a study of a plant after nature; another of a mask; a third which involves the rudiments of figure drawing. Being admitted, the student selects at will a course either in academic drawing and modeling, in the drawing of plant and animal forms, or in ornamental sculpture, to which he must add the minor subjects of the history of art and of ornament, perspective, lettering, and applied chemistry. Then, having completed these courses, he passes to one of the professors of the school proper; working with the latter six mornings of the week in his major branch, and dividing the afternoons equally between professors of the two remaining arts. Finally, having acquired a certain proficiency, he specializes under the guidance of his major professor. In the school proper there are three studios for each of the three principal arts, and to them are joined the workshops which complete the efficiency of the system. The professors are brought into close and constant contact with the students, and thus, owing to the large amount of personal instruction given, the former become responsible for the progress and the attainments of the latter. Another advantage exists in the low annual fee for instruction, which is the equivalent of $ 12; while, in some instances, even this is remitted and a monthly scholarship of the value of $ 8 is awarded upon the recommendation of a professor; further provision is also made for poor students by means of a restaurant fitted to their needs, which was established by the founder of the school, Baron de Myrbach. Altogether this institution is one that should be studied by the foreign observer, and it constitutes a single expression of that general movement which in late years has so advanced Austria and made Vienna in all that relates to municipal art the close rival of Paris.

Scotland. — Another city remarkable for its modern æsthetic spirit is that of Glasgow, Scotland, whose art school, established in 1840, and subventioned by both government and municipality, contains a department of decorative and applied arts, which receives special attention as a factor whose value in an industrial country cannot be overestimated. But the directors, in the fear lest the constant production of designers might disturb the proper relations between supply and demand, wisely added workshops to the theoretical instruction, although the former, according to the record of an expert visitor in 1907, were not so efficient as those belonging to the Vienna School. At Glasgow the chief professor of the decorative arts, M. Giraldon, teaches but three months of the year, November, February, and May; the students working alone during the intervals, under the suggestions of an associate instructor. This system is said to produce most gratifying results. Success is also attained through the nature of the assigned problems which aim at the correlation of the decorative arts, as may be seen in the hypothetical scheme to provide for a rich amateur the embellishments of a hall devoted to Shakespearean study. The specifications for this scheme demanded wall tapestries, a frieze and wainscoting in carved wood, eight circular windows in stained glass, showing ten color values; a painted decoration in six colors for the wall spaces between each two of the windows, a casket for a manuscript copy of *Julius Cæsar*, and a tablet to be placed above the entrance door. From these specifications may be determined the breadth of the instruction offered at the Glasgow school, which, perhaps, enforces theory and design to the detriment of technique, since it lacks artisans in the workshops to teach the students the exact handling of their various mediums. There, as at Vienna, the result is necessarily the creation of artists.

But, in other parts of Europe, notably in several newer institutions, the point of view is directly opposite.

Switzerland. — An instance of the latter is the School of Industrial Art, at Zürich, established in 1905, on the foundations of an earlier one dating from 1875. This school follows a system which is more easily maintained in a country without artistic originality than in one which is bound by strong traditions. It gives primarily technical instruction, with æsthetic culture as an accessory. Having this practical aim, it divides its pupils into three classes: the first comprising apprentices who, under the Swiss law of 1907, must be sent to a trade school at least 4 hours per week, for a period of 4 years; those of the second class are artisans who, already thorough workmen, wish to perfect themselves as art craftsmen, that they may design, as well as execute; while the third class is composed of somewhat skilled workmen and foremen of industrial establishments, the latter of whom often exert in their positions greater influence than the owners themselves, who, as commercial men only, are badly adapted to follow the technical processes of manufacture. As a farther step toward practicality and the prevention of useless effort, the followers of each trade are taught to draw in a special manner; the designer of textiles accentuating color, while the joiner and the metal worker emphasize the qualities of form. It must also be noted that at Zürich there are no professors of design, and that the director, M. de Praetere, is a thoroughly trained Belgian technician, who possesses, at the same time, a fine theoretical and artistic education. Under his direction the Zürich school will presumably contribute in large measure and rapidly to the formation of a national Swiss style.

Russia. — Another country presenting recent and unique interest in the same field of effort is Russia, where in all branches of art two opposite parties are active: one of which worships before the newest French altars, while the other exalts the old Russia which existed before Peter the Great. The national spirit is, however, growing strong hourly, and is destined to conquer; as may be concluded from a review of the nineteenth century, during which period, through the influence of the composer Glinka, Russian music came to prevail over that of the Italian school, and later, the old art industries of the people were revived under the leadership of women of high position favored by the Ministry of Public Instruction. As yet the artistic products obtained by these pioneers of reform are like new thoughts expressed in stammering speech. But they are also like the works of the Italian pre-Raphaelite painters, strong, vital, and appealing.

Germany. — The German Empire commands attention as containing many focal points of art interest, certain of them being of compelling brilliancy. The very existence of these multiple centers testifies to the course, character, and vicissitudes of German culture. In Germany the Reformation acted as a great solvent upon the continuity of art traditions. The essentially burgher culture there prevailing in the period just preceding that religious movement, declined with the spread of the simpler form of worship which required neither the great cathedral planned for imposing processions; nor the carved shrine, like Adam Krafft's sacrament house reaching to the crown of lofty Gothic vaults; nor yet the altar picture making its strong sensuous appeal of color. This profound change in the life of the people, together with the confusion wrought in the first half of the seventeenth century by the Thirty Years' War, so deadened the art instincts of the Germans that a strong fostering care was necessary, after a long lapse of production, again to force them into life and action. They awakened under the formative influence of the German princes who, independent and supreme within their own small domains, modeled themselves upon the old conception of a sovereign; exercising the sole governing power and becoming patrons of the fine arts, largely to satisfy their desire to surround themselves with pomp and majesty.

As an effect of this spirit, numerous art schools arose in Germany during the late seventeenth and throughout the eighteenth century, organized after the plan of foreign institutions, by whose instruction influences from Italy, the Netherlands, and France were grafted upon German art impulses, with the result of producing an interesting and independent development of foreign thought upon Teutonic soil. Of necessity these art schools were founded in the capitals or "residences" of their princely patrons; while the old free cities of the Empire, long previously the centers of the burgher art of Germany, had fallen into decline. Cities like Berlin, Munich, and Dresden, which were comparatively unimportant at the period of the Reformation, now received a powerful art impetus. But again, after the wars of the Napoleonic era had ceased, the burgher, or middle class, renewed its importance; so that in the second half of the nineteenth century, the financial and municipal power of Nuremberg, Augsburg, Frankfort, and Cologne again surpassed that of the artificially formed capitals and "residences," with the sole exception of Berlin. These brief explanations will account for the existence of the many centers of art in Germany, and, at the same time, explain the location of the academies, which, with few exceptions, are not found in the old imperial cities made famous by pre-Reformation art.

Of all the art academies now active in Germany, the one offering the greatest interest to foreigners is that of Munich: the city which has been the art capital of the country since the early part of the nineteenth century, when King Louis I of Bavaria gathered about him a company of noted artists, the greatest of whom was the Danish sculptor, Thorwaldsen, and proceeded to the foundation of such treasure houses of historic art as the Glyptothek and the two Pinacotheks. The Munich Academy dates from 1809, and the community of artists resident in that city forms practically a state within a state. In the opinion of German authorities, the long-maintained position of Munich as the art capital of the Empire has been due to the close sympathy of its productions with the life of the people, in contrast with the formal, aristocratic quality of the art of the other centers, which, throughout the nineteenth century, made no appeal to those most important social factors, the middle and lower classes. And this judgment would seem to be justified, since repeatedly impulses have gone out from the Bavarian capital which have carried all Germany with them. In the Munich Academy, which offers instruction in all branches of the fine arts, at a nominal fee, there are found students from nearly every European country, with Russians, Hungarians, and Scandinavians conspicuous among the foreigners. Formerly, too, there was a large, enthusiastic American element in attendance, but this, in recent years, shows a great decrease from the numbers reached in the days when the older generation of our living painters followed the instructions of the Academy professors; certain of them choosing Munich rather than Paris as the sole place of their foreign studies.

To-day, the departments forming the Academy are criticized in general for a too great freedom of organization and system, while the school of architecture in particular is censured for its advocacy of a devitalized style; the "cold Parthenons" which it creates being evidently survivals of the impetus given when Louis I erected his great classic structures and the Ægina marbles were carried to make their permanent home in Munich.

It is therefore through the art of the painter that the city retains its position; perhaps largely through the highly specialized branch of caricature, nowhere else so early, so broadly, and so perfectly developed. Kaulbach, the most widely known of all German painters to the Americans of a generation ago, by reason of his formal mural art, Swind, and Spitzweg delivered the traditions of caricature to the greatest living German representative of this branch, Adolf Oberländer; while the Munich *Fliegende Blätter*, *Jugend*, and *Simplicissimus*, the most important satiric publications in Germany, developed under the influence of the Munich Academy.

Another evidence of the close bonds which unite the art of Munich with the common people is the emphasis laid by the Academy upon *genre* painting, the greatest representative of his class being Defregger, the master of idealized Bavarian peasant types. Lastly, these same sympathetic relations may be deduced from the fact that thousands of tillers of the soil followed in the funeral procession of the painter Lenbach, in whose portraits of von Moltke and Bismarck the simple folk saw the symbols of the rejuvenation of the Fatherland.

In truth the new art movement in Germany dates from the unification of the Empire, after the Franco-Prussian war of 1870, and it is a phenomenon quite similar to the æsthetic awakening which pervaded Greece after the battle of Salamis, and to that bloom of literature which, in England, followed the destruction of the Spanish Armada. Before the great war, the typical German artist held himself aloof from the artisan, but since that momentous event all Germans have recognized the value of their heritage from the medieval craft guilds and the racial art of pre-Reformation times. It is plain that this fidelity to Teutonic sources of inspiration now throbs through the hearts of the painters of the Empire, without regard to regional differences, if we may judge from the selection of their works recently exhibited in America, wherein even the novice in criticism could recognize under their modern disguises the spirits of the "Little Masters of Cologne," of Holbein, of Hals, of Rembrandt, and of Ruysdael.

In all that relates to primary art instruction throughout Germany, the prophet of the movement was Wilhelm von Humboldt, who in 1809 gave voice to the spirit which became active a century later. Following von Humboldt, scientists like Virchow regretted "the insufficient talent for observation and delineation evident in the people," and so led on to the adoption in 1901 of a new plan of teaching, practically uniform, and according to which the child in his first years of training draws entirely from memory, that he may acquire, not mechanical skill, but the ability to express himself, after which he is gradually progressed to the actual, or living, model.

In Prussia, art instruction is regarded as an integral part of general education, and the drawing masters are especially trained in normal classes; while southern Germany shows great activity in the establishment of schools whose object is manual training; Munich again displaying her individuality in providing for the needs, practical and æsthetic, of the German home by fostering the art industries. In Berlin, the decorative arts are, also, highly favored, and schools teaching these branches receive municipal subsidies; while private institutions acknowledge the trend of the times by offering courses, not only in design, but also in modeling and in the handling of various mediums.

As an art capital, Berlin ranks second only to Munich; her academy dating, as we have seen, from 1694; while that of her rival was founded more than a century later, although the Prussian institution has never attracted foreign students in any considerable number, nor extended its influence beyond the limits of Germany. But the artistic importance of Berlin is rapidly growing. In architecture, through the works of Wallot and of Messel, this city has created a distinctive, individual style; in dramatic literature and stage production it holds the first place, and in the remaining arts, according to the judgment of certain critics, it will quickly advance to occupy the same high position.

Ranking after Berlin and Munich, but in an order difficult to determine, stand Dresden, Carlsruhe, Stuttgart, Weimar, and Düsseldorf, each city possessing its academy of formal art, and each also stirred by a revival of racial inspiration, as a result of the care of the present imperial government to secure the artistic education of the masses, as well as to provide for the specialized training of artists; the whole constituting a system which may be defined as "paternal," in the highest sense of that much-abused term.

Italy. — Another example of the effect of political unification upon the art teaching and, consequently, upon the art production of a people must be noted at the end of this brief review. At the Paris Exposition of 1867, Italy, then "a geographical expression," presented a collection of works which gained a greater number of prizes than was awarded to the artists of any other nationality. But in these works regional differences, both of conception and of technique, were so sharply accented that the historian, Pasquale Villari, raised an eloquent plea for the formation of a true modern Italian art, as the successor of the Lombard, the Tuscan, and the Neapolitan; indicating as a means to this end the transformation of the provincial academies with their antiquated formulæ into schools which should teach the universal, basic principles of design and composition. To-day, at a distance of forty years, although the fusion is not so complete as the enthusiastic patriot could have desired, still the processes of absorption and assimilation have so far progressed that the Italian architect, sculptor, or painter may be recognized by his creations, as the unit of an organic nation. The modern spirit walks abroad in Rome, the recognized stronghold of classic traditions, and it is difficult to realize, in Victor Emanuel's capital, that little more than a century ago, through the influence of the sculptor Canova, the Roman Academy, named from the accredited apostolic painter, St. Luke, obtained the monopoly of artistic teaching. The opening of the "Gallery of Modern Art" in Rome parallels the breach made by the army of the King in the walls of the Papal City. The engineering of the subway, the architectural treatment of the new Palace of Justice, and of the villas in the recently constructed Trasteverine quarter show that foreign influence has been permitted to mingle with native talent to the making of a new epoch. The artificial academic spirit, from its former seat in the Academy of St. Luke, dominated all the arts in Rome, but now liberty is so omnipresent in the schools that even foreigners respond to its call; the students in architecture of the *École des Beaux-Arts* resident at the French Academy having been known to send back to Paris, together with their obligatory stylistic designs and restorations, treatments of the most modern problems, such as the scheme for a model workingmen's tenement.

Of long-standing reputation and acknowledged merit are the art schools, or academies, of Naples, Florence, Milan, and Turin; the proof of their excellence existing in the men whom they sent out in the latter half of the nineteenth century; Naples alone producing three noted masters in painting, Palizzi, Morelli, and Michetti. These institutions primarily offer instruction in painting and sculpture, while courses in architecture are, in some cases, as at Turin, relegated to the engineering schools.

A last point of resemblance between Germany and Italy, as an effect of unification, may be seen in the development of the industrial arts, which began about the year 1880, and is still in active progress. Although the last country to join in the arts and crafts movement, following in this France, Germany, England, and Austria, Italy, in so doing, simply renewed connection with her artists of the Middle Ages and of the Renaissance, who did not disdain to produce the humblest objects of domestic service, since they glorified them with a touch of genius. Most interesting results of this movement were seen at the Turin Exposition of 1902; that city and Milan being the centers of instruction in the decorative arts. In some instances, also, the workshops of art artisans, or those even of commercial firms producing objects of art, take the place of schools; a system of instruction founded on historical precedent, and which, although privately conducted, is the same in principle as the method pursued at Zürich under governmental control, and aiming to unite in one person the artist and the artisan.

Thus, the conclusion to be gained from a cursory review of the art schools and the existing art tendencies in Europe is that everywhere in the Old World, even in the most conservative cities and institutions, there is a movement which, in Russia, would be termed "going toward the people." I. S.

See the various articles on the educational system of each country for full statement of the various art schools; also ARCHITECTURAL EDUCATION; ART IN THE SCHOOLS; DESIGN; DRAWING; etc.

United States. — In studying the art schools it is necessary to distinguish between the different types of schools in which the visual arts are taught. Although some of the schools include several departments, the majority can be classed under one of the following heads: (1) fine arts schools, where drawing, painting, and sculpture alone are taught; (2) schools of design, where, in addition to the academic branches, design in its application to manufactures is given; (3) schools of architecture; (4) industrial art schools with workshops that closely approach conditions in the manufacturing world; (5) manual training and technical schools; (6) normal art schools; (7) general instruction in drawing and the history of art, given entirely for their cultural value. This article treats in detail the first and second of these groups. The schools of architecture, industrial art schools, manual training and technical schools, will be found under the appropriate heads. The sixth and seventh topics are discussed under the preceding topic, Art in the Schools.

During the eighteenth century any citizen of the American colonies who wanted to learn how to paint was obliged to go to Europe, and the success of Benjamin West, born in Pennsylvania in 1738, led many young Americans to follow him to London. With the death of West in 1820, London ceased to be the Mecca of American portrait and historical painters. The first quarter of the nineteenth saw a so-called "revival of art" in Germany, led by Overbeck (1789–1869) and Cornelius (1783–1867), the latter becoming the head of the Munich school, and painting heroes of the classic and the Christian world on a large scale. After 1826 Düsseldorf came into prominence under the guidance of Schadow (1789–1862), and this school was inclined toward the easel picture with sentimental, dramatic, or romantic subjects. Emanuel Leutze (1816–1868), German by birth, but an American by adoption, was a pupil of Lessing at Düsseldorf, and had a good deal to do with introducing Düsseldorf methods into America. Another and a stronger influence was that of the French romantic movement, which can be dated from the year 1822, when Delacroix exhibited his "Dante and Virgil" at the Salon. A Boston painter, William Morris Hunt (1824–1879), went to Paris, where he became a pupil of Couture, and, after spending several years at Barbizon with Millet, returned to Boston, in 1855, where his personal force attracted many pupils. He was a painter of ability, but perhaps his greatest influence was as a teacher, and many prominent American painters, notably John La Farge, trace their beginnings to his studio. About 1870 Munich again drew many American students. Walter Shirlaw went there when the siege of Paris closed that city to art students. Frank Duveneck and William M. Chase studied in Munich in the early seventies.

But while many ambitious painters and sculptors found their way to the European schools, art was beginning to take root in the United States. As far back as 1791 Charles Willson Peale tried to found an art school in Philadelphia. He was not successful, but his attempt led, in 1805, to the establishment of the Pennsylvania Academy of the Fine Arts, the oldest art institution in the country. The Schools of the National Academy of Design date from 1826, while 1844 saw the establishment of the Philadelphia School of Design for Women; Cooper Union (*q.v.*), which included a free school of art for women as well as evening classes in drawing for men, was opened in New York in 1857; the school of the Art Institute of Chicago is a direct continuation of the old Academy of Design organized in that city in 1867 and never suspended except at the time of the great fire in 1871; 1873 saw the establishment in Boston of the Massachusetts Normal Art School; and the Art Students' League of New York was organized in 1875. The Philadelphia Centennial Exposition of 1876 gave a strong impetus to art education, and was followed by a rapid growth of art schools. The School of Drawing and Painting of the Boston Museum was started at once; the School of Industrial Art of the Pennsylvania Museum followed in 1877, with the Rhode Island School of Design at Providence the same year and the St. Louis School of Fine Arts in 1879. The present status of the principal schools of fine arts and of design in the United States is shown in the following paragraphs: —

Schools of Fine Arts. — *New Haven, Conn.* — *The Yale School of Fine Arts* was founded by Augustus Russell Street in 1864, and occupies a building on the university grounds with well-appointed classrooms and galleries that contain the Jarves Collection of Italian paintings, the most important public collection of this period in the United States; the Trumbull collection of historical portraits and other paintings illustrative of the American Revolution; as well as a general collection. The registration for 1909–1910 was 82, and there are 8 instructors. The courses in painting, sculpture, and architecture lead to the degree of Bachelor in Fine Arts. The Winchester Fellowship provides $1000 a year for European study; this and several smaller scholarships and prizes are endowed. The total equipment, including professional foundations, is valued at $400,000. Fees are $30 for a term of 3 months.

New York. — *The Art Students' League* of New York was founded in 1875 and incorporated in 1878 for the purpose of establishing and maintaining an academic school of art, which should give a thorough course of study in drawing, painting, and sculpture. The founders were students in the life classes of the National Academy of Design, who established this school to secure increased facilities. It is a coöperative institution managed by a Board of Control consisting of 12 members, elected annually, who receive no remuneration. A majority of the members of the board are students actually at work in the classes. The school is self-supporting, and, having no endowment fund, it is run entirely upon the tuition fees of its pupils. Artists and students intending to make art a profession, who have worked in the life classes 3 months, may be elected members of the League. The League is a stockholder in the American Fine Arts Building, and occupies the upper floors of the building, while the galleries on the main floor are devoted to the annual exhibition of the National Academy of Design, the American Water Color Society, the New York Water Color Club, and the Architectural League. This school is the model on which many others throughout the country have been organized. The fees are from $30 to $70 for the winter term of 8 months, $35 in the evening classes or the Saturday classes, and $20 for the summer school in New York. A summer school is also maintained at Woodstock, N.Y. Prizes and scholarships to the number of 17 are given in the school. There is also an annual competition for scholarships, open to all art students in the United States and Canada, with the exception of New York City, whereby 10 scholarships are awarded for the best work shown. The enrollment averages 1000 during the winter, with 14 instructors; in the summer there are about 100 students.

The National Academy of Design traces its origin back to 1802, when it was proposed to found the New York Academy of the Fine Arts. Officers were elected on Dec. 3 of that year, and on Feb. 12, 1808, a charter was obtained under the name of the American Academy of Arts. Shortly before securing its charter, Robert R. Livingston, then Ambassador to France, purchased by order of the trustees and sent to New York a number of casts from the antique, probably the first casts ever brought to this country. The institution lay dormant for many years, but was revived by an exhibition in 1816, and in January, 1818, John Trumbull was elected president. During the following summer the collection of casts was opened to students in the mornings from 6 to 8 o'clock, with William Dunlap as keeper. The hours were inconvenient, few attended, and the first attempt at founding an art school in New York failed. Another unsuccessful attempt to open the collection of casts to students led to a meeting of artists on Nov. 8, 1825, in the rooms of the New York Historical Society, and the New York Drawing Association was formed, with S. F. B. Morse as president. At a meeting of the Drawing Association on Jan. 18, 1826, they organized the National Academy of Design, to be composed and governed entirely by artists. It was at first only an evening drawing class, but in time exhibitions were successfully managed and the school enlarged, and for many years the academy occupied its own building at Fourth Avenue and 23d Street. Since October, 1899, the schools have been located at Amsterdam Avenue and 109th Street, not far from Columbia University, with which they are now affiliated. The exhibitions, however, are held in the American Fine Arts Building at 215 West 57th Street. The instruction is purely academic, if one excepts the class in etching. There are about 250 students, under 10 instructors. All instruction is free, but examinations must be passed to secure admission, and no applicant over 30 years of age is accepted. There are numerous prizes and scholarships, including the Mooney Memorial Traveling Scholarship of $750 a year for 2 years and the Lazarus Traveling Scholarship. This last consists of $1000 a year for 3 years and is open to any male citizen of the United States who can successfully pass the examinations which are held every third year at the Academy.

Philadelphia, Pa. — *The Pennsylvania Academy of the Fine Arts* was organized in 1805 at a meeting held in Independence Hall, and shortly after a building was erected which was occupied for half a century. In 1876 the present building was dedicated. It contains a permanent collection of painting and sculpture, including the Gallery of National Portraiture, the Temple Collection of Modern American Paintings, and the Gibson Collection of paintings by European artists of the nineteenth century. Annual exhibitions of oil paintings and sculpture, of miniatures, of water colors, and of architecture are held in the galleries. The school at present has a registration of about 400, with 10 instructors. The course is strictly academic, and includes the antique, life and head painting, illustration and modeling. There are 2 terms in the school year; fees $50 a term. The Cresson Fund enables the academy to award $500 traveling scholarships to 20 or more students each year in the departments of painting, sculpture, and illustration. There are several other prizes of lesser amounts.

Washington, D.C. — *The Corcoran School of Art* is maintained in the Corcoran Art Gallery, and has been part of the regular work of that institution since it was incorporated in 1870. The academic subjects alone are taught, and the registration is about 225, with 6 instructors. There are day and evening classes, all of which are free.

The American Academy in Rome was incorporated by Act of Congress on March 3, 1905, "for the purpose of maintaining an institution to promote the study and practice of the fine arts and to aid and stimulate the education and training of architects, painters, sculptors, and other artists, by enabling such citizens of the United States as shall be selected by competition from among those who have passed with honor through leading technical schools or have been equally well qualified by private instruction or study, to develop their powers and complete their training under the most favorable conditions of direction and surroundings." The Academy occupies the Villa Mirafiori in Rome, Italy, and has an endowment fund of nearly $1,000,000. It is the home of the various holders of scholarships who carry on their work under the guidance of the Director of the Academy. The principal scholarships available are those of the Academy itself, which now sends to Europe each year for 3 years one architect, one sculptor, and one painter; the Lazarus scholarship for mural painting; the Paige scholarship in painting; the Rinehart scholarship for sculpture; the McKim, the Society of Beaux-Arts, the Cornell, the Rotch, and several others in architecture.

Schools of Design.—Among the schools of design many will be found conducting academic courses side by side with their department of design, and also classes in the various crafts, such as bookbinding, pottery, and metal work. The numerous small arts and crafts societies scattered over the country form centers for teaching the crafts, and many have salesrooms for the disposal of members' work. A number of these societies are federated, and the Boston Society of Arts and Crafts serves as the headquarters of the National League of Handicraft Societies.

Baltimore, Md. — The Maryland Institute of Art and Design occupies its own building, which was erected in 1907. Over 700 students receive instruction from 43 teachers in both day and evening classes. The courses include the usual academic training in drawing, painting, and sculpture; the architectural department has over 300 students; there is a normal department; and special classes for illustration and for design and applied arts. The fees are nominal. There are several prizes and scholarships, including the Rinehart scholarship in sculpture, open to any American man not over 37 years of age, and entitling to 4 years of European study.

Boston, Mass. — The Museum of Fine Arts was incorporated in 1870, and included as one of its " objects " to provide opportunities and means for giving instruction in drawing, painting, modeling, and design, with their industrial application through lectures, practical schools, and a special library. The museum building in Copley Square was opened July 4, 1876, and soon after arrangements were made whereby three rooms in the basement were assigned, free of rent, to the School of Drawing and Painting then being conducted by Otto Grundmann and Dr. William Rimmer. This arrangement was continued with the use of additional room until the removal of the museum to its new building, which was opened in the autumn of 1909. The school is now installed in a building designed and erected for it on Huntington Avenue, adjoining the Museum of Fine Arts. Instruction is offered in drawing, painting, modeling, and design, with supplementary courses in anatomy and perspective. The school is open to both sexes; the number of pupils in 1909–10 was 263, of whom 74 were in the department of design; there are 13 instructors. A unique feature, known as the Master's Class, is the postgraduate course, whose object is to instruct advanced pupils in the art of constructing and painting pictures. These special pupils ordinarily have studios to themselves, models are furnished when required, and criticisms are given by members of the regular corps of instructors. There are 3 terms in the school year; fee for the year $100. The school awards 16 scholarships entitling to free tuition; the Paige traveling scholarship, open to both sexes, is awarded for general excellence and consists of $800 a year for 2 years' travel; there are several other money prizes, and diplomas are given, upon application, to those who have fulfilled the requirements of the Council. The course in design is conducted by means of problems, by the study of the development of design and its relation to sculpture, painting, and architecture. There are also lectures by specialists given at the school or at the museum. There is a course in metal work and one in interior decoration, and there is a postgraduate course for those who desire technical training in professional work. Pupils must be over 16 years of age. The tuition fee is $110 a year; evening classes $20. There is a traveling scholarship of $200 a year, limited to men students, a scholarship providing a visit to an American Museum of Fine Arts, and cash prizes for the best work done in design.

Buffalo, N.Y. — The Art Students' League, founded in 1888, now occupies room in the Albright Art Gallery, and is therefore in close touch with the permanent and current exhibitions. There were, in 1909–10, 266 students under 6 instructors. The courses include the academic branches, and also design, metal work, and a normal course.

Chicago, Ill. — The Art Institute of Chicago has the largest number of students and offers special advantages for study, owing to the fact that here are found the combination of the art museum, a well-equipped library, a large auditorium with regular course of lectures, current exhibitions of work by foreign and American artists, and a staff of about 50 instructors. The attendance for the year ending May 31, 1909, was 3222, which included students in the day, evening, Saturday, and summer classes. There are seven distinct schools with different principals: academic, decorative design, normal, architecture (which is affiliated with the Armour Institute of Technology), evening, Saturday, and summer. The school is organized upon the French " atelier and concours " system. There are two foreign travel scholarships of $245 each, and two American scholarships of $250 and $125 respectively. The fees average $30 a term for the three winter terms, and $25 for the summer term. Large schemes are frequently carried out by the school, such as the mural decoration of a Public School and the Pageant given in 1909.

The Academy of Fine Arts is a private school in Chicago, which, with a staff of 15 teachers, gives instruction to about 400 students in the academic branches, illustration, commercial design, mechanical drawing, interior decoration, metal work, and leather work.

Cincinnati, Ohio. — The Art Academy dates from 1869, when the McMicken School of Design was established in accordance with a bequest to the city of Cincinnati; in 1884 it was transferred to the Museum Association, and the present building in Eden Park, close to the museum, was dedicated in 1887. The attendance for 1909–10 was 383, and there are 10 instructors. There are day, evening, Saturday, and summer classes. In addition to the academic branches there are classes in modeling, wood carving, design, and china painting. The location of the Rockwood Pottery in this city gives a special reason for the last-mentioned course. The average fee is $25 for each of the winter terms and $20 for the summer term.

Cleveland, Ohio, School of Art was incorporated in 1882 as the Western Reserve School of Design for Women, but has been known under its present name since 1891. A well-equipped building, erected on a site donated by J. H. Wade, was opened in 1905; a separate building for the department of sculpture was erected and equipped by Thomas H. White at a cost of $15,000. The students number about 350, and there are 14 instructors. The regular 4 years' course includes pictorial art, decorative design, architectural sculpture, and normal art training; special classes in illustration, cartooning, and ceramics; also evening classes for both men and women, and Saturday classes. The fees average $50 a year.

Columbus, Ohio, Art School was founded by the Columbus Art Association in 1879. There are about 150 students and 4 instructors. Decorative design is taught in addition to the usual academic subjects. The fee is $15 for 36 lessons in painting, and other subjects in proportion.

Indianapolis, Ind. — The John Herron Art Institute School is conducted by the Art Association of Indianapolis and it occupies a well-equipped building dedicated in October, 1907, and situated near the museum. There were, in 1909–10, 350 students, with 15 instructors. The courses include the academic branches, design, metal work, wood carving, and ceramic decoration. The fees average $10 a month.

Los Angeles, Cal., College of Fine Arts, of the University of Southern California, was established in 1901. The registration for 1909–10 was 253, under 7 instructors. There are three-year courses in the fine and in the applied arts, open free to both men and women.

Minneapolis, Minn., School of Fine Arts is located in the Public Library Building. The school was founded in 1886 by the Minneapolis Society of Fine Arts, and has an excellent collection of casts. There were during 1909–10 275 students and 7 instructors. There are 4 distinct departments: academic, decorative design, handicraft, and architecture. There are also evening, children's, and summer classes. The fees average $40 for the year of 3 terms.

New Orleans, La. — The Art Department of the Sophie Newcomb Memorial College for Women was founded in 1888, and now occupies its own building. The courses include the academic, pottery, textile, and normal. The pottery (marked N. C.) is a unique feature, and has led to the establishment of a salesroom and to its general sale in other cities. There are about 100 students, with 11 instructors. The fee is $15 for each term of 12 weeks and $10 a month in the summer school.

New York, N. Y. — Cooper Union maintains a Free Woman's Art School and a Free Night School of Art for Men. In the former the average attendance during 1909–10 was 325, with a waiting list of 64; in addition to the academic studies there are classes in illustration, design, and miniature painting. The evening School for Men is attended by over 1100 students, and there is always a waiting list. The courses include architectural and free-hand drawing, decorative design, and modeling. The Cooper Union Museum for the Arts of Decoration offers special facilities for study, and there is also a large general library in the building, which was dedicated by Peter Cooper in 1857 "to be devoted for ever to the union of Art and Science in their application to the useful purposes of life." All instruction is free, and there are several cash prizes and scholarships, including one at the Byrdcliffe Summer School of Art.

New York School of Applied Design for Women was founded in 1892 by Mrs. Dunlap Hopkins for the purpose of affording women practical instruction which will enable them to earn a livelihood by the application of ornamental design to manufacture and the numerous arts and crafts. In the autumn of 1909 the school moved into its own building specially erected and adapted to its needs. The elementary department includes instruction in object drawing, perspective, flower drawing and painting, drawing from the antique, conventionalization, and historic ornament; the advanced department teaches the application of design to the manufacture of wall paper and of silk, illustration, and the work of an architectural draughtsman. There were, during 1909–10, 534 students under 15 instructors. There are 3 terms in the year, and the tuition fees are $25 each term. About $600 is awarded annually in prizes, and in each of the advanced departments a scholarship for the following year is given. The library contains about 8000 plates.

New York School of Fine and Applied Art is the successor to the Chase School, which was established in 1895. The present courses include the academic, commercial illustration, normal, decorative design, interior decoration, costume design, clay modeling, metal work, basketry, china painting, and Saturday and children's classes. The fees vary from $2 a month in the sketch class to $100 a season for all-day work in the portrait class. No examinations are necessary.

Pratt Institute, founded in 1887, gave instruction in its School of Fine and Applied Arts during 1908–1909 to a total of 953 students, divided as follows: 152 male and 294 female in the day courses, 270 male and 55 female in the evening, and 67 boys and 115 girls for special work. There are 34 instructors; the department contains 40 classrooms, studios, and offices; a museum is connected with the department; and there is an art gallery in the adjacent library building in which exhibitions are maintained from October to June. The various courses of study include: life, portrait, and pictorial illustration; costume illustration; composition and design; modeling; oil and water color painting; general applied design, stained glass, interior decoration, textile and furniture design, art metal, jewelry, chasing, enameling and medal work; architectural construction and architectural design; and normal art and manual training. The general art course covers 4 years, and is fundamental to all others. The fees for the day courses are $25 for each of the 3 terms in the season; evening classes $15 for the season of 6 months. Examinations are required for admission.

The Young Women's Christian Association of New York maintains morning, afternoon, and evening classes for the purpose of training designers to apply art to the industries. The courses include design, costume designing, color work, wood carving, modeling, and embroidery. The attendance during 1909–10 was 88, and there are 3 instructors. The fees are from $10 to $20 a year.

Philadelphia, Pa. — The School of Design for Women was founded in 1844 in the home of Mrs. Sarah Peter; when it had outgrown the limits of a private enterprise, the Franklin Institute assumed the management of the school until 1853, when it was incorporated. Its present home is the Forrest Mansion, and there are about 150 students, with 10 instructors. In addition to the academic branches there is a normal course of 4 years and courses in technical design, illustration, and general applied design. The fees are $35 a term, and there are 2 European and 5 school fellowships.

Providence, R.I. — The Rhode Island School of Design was incorporated in 1877, and gives as its purpose: (1) The instruction of artisans in drawing, painting, modeling, and designing, that they may successfully apply the principles of art to the requirements of trade and manufactures. (2) The systematic training of students in the practice of art, that they may understand its principles, give instruction to others, or become artists. (3) The general advancement of art education by the exhibition of works of art and art studies and by lectures on art.

The museum consists of eight galleries containing oil paintings, casts from the antique, Japanese art objects, and peasant pottery. The Colonial House built by Stephen O. Metcalf is a continuation of the galleries, and contains the Pendleton collection of antique furniture, pottery, textiles, and paintings. During the course of the year a number of special exhibitions are held. The school registration for 1909–1910 was 960, and there are 44 instructors. Full courses of instruction leading to a diploma are offered in the 8 departments of the school: freehand drawing and painting; decorative design; modeling and sculpture; architecture; mechanical design; textile design; jewelry design; and normal art. Students are required to attend a series of lectures on the principles of design and to do a prescribed amount of reading. Fees are $35 for each of the 2 terms for the day classes of 30 hours a week; $9 a term for 6 hours a week in the evening classes. In addition to the studios in the main building on Waterman Street, the department of design is located in Memorial Hall on Benefit Street, where there is also a large hall seating 800 people; a generous gift of the building at 35 North Main Street enabled the opening of this building in the fall of 1909 for the machine shops, the departments of jewelry design, modeling, and painting, the laboratories of the textile chemistry classes, and a large lecture room.

Rochester, N.Y. — The Department of Fine and Applied Arts of the Mechanics' Institute occupies the Bevier Memorial building, erected in 1908. There are about 300 students, under 8 teachers. The courses include the academic branches, architecture, decorative and costume design, and normal classes. The fees are $26 a term, with 3 terms of 3 months each. There are 4 scholarships, and several small prizes. Lectures are given and exhibitions are held from time to time.

Saint Paul, Minn., Institute School of Art is the outgrowth of a class in china painting organized in 1890 by a group of women. In 1894 it was incorporated under the name of the St. Paul School of Fine Arts, and when the St. Paul Institute of Arts and Sciences was incorporated in 1908, it took over the school. Rooms in the auditorium building were leased from the city, and the school now occupies the whole top floor and a large part of the middle floor. The registration for the year ending June, 1909, was 375, with 6 instructors. There is a general fine arts course and one in design and handicraft; the latter includes stenciling, block printing, pottery, leather work, bookbinding, jewelry, and metal work. The tuition fees are from $30 to $50 for the year of 8 months. There are several scholarships and prizes.

Saint Louis, Mo., School of Fine Arts originated in a free evening drawing class organized by Halsey C. Ives in 1874, and was formally established as a department of Washington University in 1879 under the directorship of Professor Ives. A home for the work was provided through the generosity of Wayman Crow, a large collection of casts was obtained from Europe, and a loan collection of paintings was shown when the building was dedicated in 1881. Following the World's Fair in 1904 changes in the organization have led to the City Art Museum being located in Forest Park, and the School, in the autumn of 1909, moved to what was formerly known as the British Pavilion, now a part of Washington University Grounds. The rooms which formed part of the exhibit of the British government will be preserved intact, as well as the beautiful formal garden on which the building faces. It is within 8 minutes' walk of the Museum. The course of instruction includes the academic branches; architectural and mechanical drawing; historic ornament; decorative design for textiles, wall paper, etc.; ceramic decoration; molding and turning of pottery; bookbinding; metal work; wood carving. There is an extended lecture course, and work in the library is required. For both the day and evening classes there are 2 terms in the year. Fee for full tuition in all day classes $50 for each term of 18 weeks.

San Francisco. — *The California School of Design* is managed by the San Francisco Institute of Art, and is affiliated with the University of California. There are day and evening classes in the academic branches, and courses in design and normal art training with a teaching staff of 9. The fees are from $12 a year for the Saturday class to $75 a year for the full course.

Syracuse, N. Y. — *The College of Fine Arts of the Syracuse University* gives a 4 years' course in painting, 2 years' in design, and a special course in illustration. The registration is about 150, and there are 6 instructors.

Worcester, Mass. — *The School of the Worcester Art Museum* was founded in 1898, and occupies the residence of the late Stephen Salisbury, the founder of the Worcester Art Museum, which has been remodeled for school purposes. In addition to the usual studies and lecture rooms, there are shops for metal work, weaving, and bookbinding. The main building of the museum is near at hand, and the pupils have free access to it for study, library work, and exhibitions. The course includes drawing and painting, design, metal work, bookbinding, weaving, and the history of art. There is a Wednesday evening class in design and one on Saturday morning for children. There are three terms of 10 weeks each and the fees are $12 a term, or $30 for the full year. The attendance for 1909-10 was 114, and there are 4 instructors.

Art Museums. — Important factors in art education are the museums and societies that are constantly holding exhibitions. In many cases the art school is directly associated with the local art museum, as at the Art Institute of Chicago, the Pennsylvania Academy of the Fine Arts, and others. At the Boston Museum, the Metropolitan Museum in New York, and others, expert guidance and courses of lectures form part of the regular work, and information about this will be found under the article on Museums. In the smaller cities the library is the art center, and many art schools are located in library buildings. (See MUSEUMS.)

The object of the older art schools was the academic training of professionals and amateurs in the arts of drawing, painting, and sculpture. Modern educational ideas tend to train the craftsman, the industrial art worker. The older method aimed to make painters of easel pictures and carvers of ideal sculpture, while only if the pupil failed to reach the desired standard was his attention directed toward the wide field of the industrial arts. To-day the aim is to develop among the vast majority of the people the industrial value of good craftsmanship which comes from the ability to use hand and eye with that knowledge and skill which are derived from the study of drawing, painting, and modeling. When here and there an unusually talented pupil is discovered, every possible opportunity should be given for the development of the talent. There is also, underlying all the instruction, the cultivation of an appreciative public. F. L.

See ART IN THE SCHOOLS; ART, METHODS OF TEACHING.

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International Studio. (London and New York.)
La Rassegna d'Arts. (Rome.)
Magazine of Art. (London.)
Reports of the Proceedings of numerous educational bodies.

ART MUSEUMS. — See ART SCHOOLS; MUSEUMS.

ARTICLE. — See NUMBERS.

ARTICULAR SENSATION. — When a member is moved one is conscious of the movement. This consciousness of the movement was referred by Goldscheider in large part to the joint. He found that anæsthesia of the joint induced by passing an electric current through it decreased the sensitiveness to movement. He also convinced himself by direct experiment that the surfaces of the joints were sensitive to strong stimuli. It has been questioned whether the current really anæsthetizes the joint or affects the muscles and tendons about it. Then, too, no sense ends have been discovered on the joint surfaces. Those skeptical of the existence of an articular sensitivity would explain the appreciation of movement in terms of sense organs in muscle, tendon fasciæ, and even in the external skin. W. B. P.

ARTICULATION. — This term is employed in educational discussion to designate the process of adjusting the work of one type of school to that of another, in order to make more effective the transition of the pupil. Owing to their independent origins, the transition from the elementary school to the secondary school is especially difficult. Subjects and methods of instruction present new problems to the student. The result is that a considerable number of pupils fail early in their high school career, owing to what may be removable difficulties.

In order to make the transition less difficult, the plan has been proposed, and occasionally carried out in practice, of making the beginnings of Latin or a modern language in the upper grades of the elementary school; developing some work in algebra and geometry along with the arithmetic of the same grades; the application to the teaching of eighth-grade literature of some of the methods employed in the high school; and, finally, the development in the upper grades of departmental teaching (*q.v.*) so as to accustom pupils to the methods of special teachers. In spite of various attempts in this direction, it still remains true that the transition involves considerable hardship, and in recent years attempts have been made, by means of elective subjects in the high school and by having high school teachers study the qualifications of elementary pupils, to relieve the situation from this side.

Similar difficulties are often found in the transition from secondary school to college, less, however, owing to lack of articulation in studies and curricula than to change of social surroundings. D. S.

See Accredited Schools; College; College Entrance Requirements; Flexibility in the Grades; High Schools.

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Dutton and Snedden. *Administration of Public Education in the United States.* (New York, 1908.) See chapters xviii and xx, and the references there given.

ARTS, SEVEN LIBERAL. — See Liberal Arts, Seven.

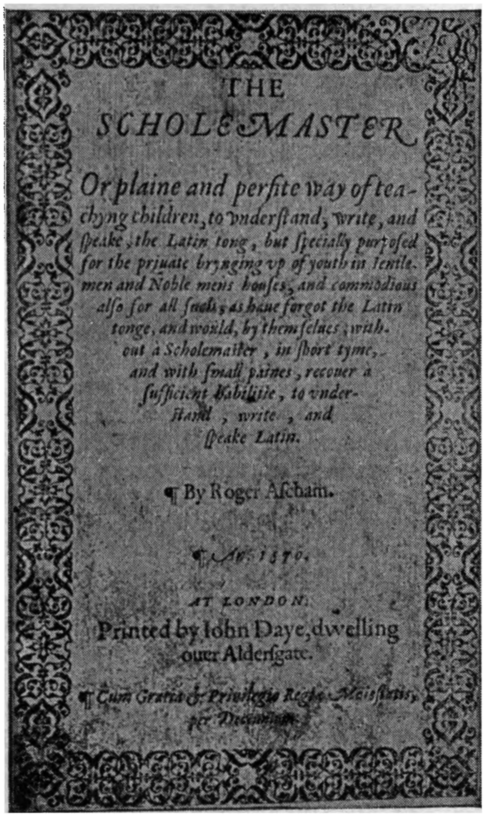
ARYABHATTA. — The first great Hindu teacher of mathematics whose works have come down to us. He was born at the ancient Kusumapura, the City of Flowers, a little town on the Jumma just above its confluence with the Ganges, and not far from the present Patna, called by the Mohammedans Azimabad, by the ancient Buddhists Pataliputra, and by Megasthenes, the ancient Syrian ambassador, Palibothra, so that Aryabhatta's birthplace is given under these various names. The date of his birth is 476 A.D., so that his work was done early in the sixth century. He wrote three treatises, the *Aryabhattīy*, *Dasá-gītikā*, and *Āryāshtasata.* The first treats of arithmetic and algebra, and was probably the standard text for centuries. It is noteworthy that Aryabhatta gives the value of π as in our notation 3.1416, a remarkable approximation for the period. D. E. S.

ASBURY COLLEGE, WILMORE, KY. — A coeducational institution founded in 1890 and held in trust by a board of trustees mostly Methodist. A model school, giving instruction in common school branches, academic, college, and theological departments are maintained, as well as courses in commercial and fine arts subjects. The entrance requirements, when a certificate from the academy or accredited high schools is not presented, are equivalent to about 2 years of high school work. In the college degrees are given on work in the classical, scientific, and literary courses. The faculty consists of 5 professors, 3 associate and 2 assistant professors, and 6 instructors and assistants. Aaron S. Watkins, LL.D., is the president.

ASCHAM, ROGER (1515–1568). — Son of the steward to Lord Scrope of Bolton, born at Kirby Wiske, near Northallerton in Yorkshire. In 1530, he entered St. John's College, Cambridge. After graduating M.A. in 1537, in 1538 he was appointed Greek reader at St. John's College. He was a renowned calligrapher. In 1546 he succeeded Sir John Cheke as public orator in the University of Cambridge. He was the tutor of Princess (afterwards Queen) Elizabeth. In 1550 he became secretary to Sir Richard Moryson, English ambassador to the Emperor Charles V. He then traveled for two years in Italy and Germany. In 1553 he became Latin Secretary to Queen Mary. He married Margaret Howe in 1554. In 1545 he published his *Toxophilus*, and in 1570 his *Scholemaster* appeared, posthumously. His other works were (1) *A Report of the Affairs and State of Germany*, 1553. (2) Some Latin poems. (3) Some theological tractates. (4) His letters, 295 in number, edited by Dr. Giles in the *Whole Works of Roger Ascham* (1865).

The *Toxophilus* (1545) is a noteworthy work for two reasons. Ascham's advocacy of archery as a pleasant and patriotic form of exercise places him as a pioneer on educational physical exercise, as against the ordinary bookworm Renaissance scholar. And, secondly, Ascham uses his opportunity to educate with genuine enthusiasm. He employs the English language in writing his book, rather than Latin or Greek, as he declares he could readily have done. The following educational ideas are advanced in the *Toxophilus:* shooting should be with the bow "fit" for scholars and students, as well as for princes and great men; youth ought to learn to sing, but not to get wrapt up in music; no man can "use" too much shooting; a protest against cards and dice; the importance of shooting as a recreation in training for possible use in war. He states as a fundamental principle that in learning anything (*e.g.* in shooting) a man "must covet to be best, or else he shall never attain to be mean."

The *Scholemaster* (1570) is Roger Ascham's great educational work. It is one of the most representative of Renaissance writings in England, one of the most typical works of the time in English literature and one still of real importance in its view of the early teaching of the classics. Its style is attractively quaint and spontaneous, and at the same time it is full of common sense as well as of learning. It gives a historical insight into the social conditions of the age, and combines both descriptive accounts of actual teaching and of suggested reforms. The running away from Eton College of several scholars for fear of a beating induces Ascham to write his book to plead for such gentleness in the schoolmaster as will inspire his pupils' love. Other points are the nature of quick and hard wits; of the limitations that should be placed on the choice of those selected for the higher learning. Ascham then proceeds to deal with the young gentlemen; the too great liberty to "live as they lust"; of their letting loose too soon to overmuch experience of ill; of the gathering of wit and fortune by the method of experience compared with the method of learning, showing that the school of *experience* is very costly; and lastly of the journeyings of young Englishmen into Catholic countries as very hazardous, and ordinarily attended with more harm than good.



THE
SCHOLEMASTER
Or plaine and perfite way of teachyng children, to vnderſtand, write, and ſpeake, the Latin tong, but ſpecially purpoſed for the priuate brynging vp of youth in Ientlemen and Noble mens houſes, and commodious alſo for all ſuch, as haue forgot the Latin tonge, and would, by themſelues, without a Scholemaiſter, in ſhort tyme, and with ſmall paines, recouer a ſufficient habilitie, to vnderſtand, write, and ſpeake Latin.

¶ By Roger Aſcham.

¶ An. 1570.

AT LONDON.
Printed by Iohn Daye, dwelling ouer Alderſgate.

¶ Cum Gratia & Priuilegio Regiæ Maieſtatis, per Decennium.

Ascham is particularly well known by his double translation method of learning Latin. The steps are: (1) the master construes a passage to the pupil as often as the pupil needs; he also parses it over "perfectly"; the pupil then construes it orally, and is tested to see that he "doubteth in nothing"; (2) the pupil next translates the same passage, writing it out in a paper book. This the master examines, corrects, and returns. (3) After an interval of "an hour at the least," the pupil translates back his own corrected English rendering into Latin in a second paper book. Then the master is to compare the pupil's Latin with the original, and when the right words and true construction and learning of words are given, to say "Here ye do well." If the pupil has "missed" in, say, a passage of Cicero, let the master point out what Cicero would have done differently from the pupil's performance.

Thus exercised in the double translation from Latin to English, and from English to Latin, the pupil's observation is to be exercised to note, in a *third* paper book, synonymous terms, metaphors, phrases, and so on. Grammar is thus entirely subordinated to classical literature. Ascham interestingly discusses the contemporary methods of teaching by paraphrases, metaphrases, epitome, imitation, and declamation, and offers suggestions as to reading of authors. In the course of the *Scholemaster* passages of historical interest and literary style occur when he speaks of educational topics connected with Lady Jane Grey and Queen Elizabeth. Queen Elizabeth — in return — is reported to have said on hearing of Ascham's death that she "would rather have thrown ten thousand pounds into the sea than have lost her Ascham."

F. W.

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ASHLAND COLLEGE, ASHLAND, OHIO. — A coeducational institution founded in 1878 and incorporated in 1888 as the Ashland University, under the auspices of the Conference of the Brethren Church. There are no definite entrance requirements. Preparatory, normal, college, theological, commercial, and fine arts departments are maintained. Degrees are given on completion of the necessary courses. There are 11 professors and 4 instructors on the faculty. John Lewis Gillin, B.D., Ph.D., is the president.

ASS'S BRIDGE. — Or *pons asinorum*, a term applied by English and American mathematicians to the fifth proposition in the first book of Euclid. When the term arose is not known, but probably at a late period. The origin of the term is also open to doubt. By some it is thought to have arisen from the difficulties which the fifth proposition presented to beginners. Probably, however, the figure used by Euclid to illustrate the proposition, from its resemblance to a bridge, gave rise to the term. The French mathematicians refer the term to the Pythagorean proposition. (Euclid I, 47.)

ASSEMBLY ROOMS.—See ARCHITECTURE, SCHOOL.

ASSER.—See ALFRED THE GREAT, and ANGLO-SAXON EDUCATION.

ASSIGNMENT. — A special portion of the lesson period, usually at the close, in which the assignment work is made for the next day. As a type of teaching activity it is sometimes spoken of as an "assignment lesson," inasmuch as considerable care and time is given to presenting the problem to be solved by the child, preparing his mind for the work to be done, and suggesting the materials, observations, books, maps, etc., which he is to utilize. In a sense, the "assignment" represents the stage of "preparation" in a lesson which the pupil is to continue at home, without the supervision of the teacher. H. S.

See TEACHING, TYPES OF; LESSON TYPES.

ASSIMILATION. — Used in technical psychology to describe a phase of perception whereby present experiences are related to earlier experiences and so modified as to conform in character to the earlier experiences. Thus if one hears a sound and by a process of association relates it to a word which is familiar in his experience, the present sound will take on a form similar to the earlier sound, even though its present form may be somewhat different. This appears most clearly when we misunderstand a word by virtue of the modification of the present sound through earlier experiences. C. H. J.

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ASSISTANT TEACHER. — See TEACHER, ASSISTANT.

ASSOCIATION. — The term and fact of association has played an important part in the explanation of the mental operations from the time when mental processes first attracted notice. Briefly stated, association is an attempt to explain the order of ideas in terms of the connections established by earlier experiencing of the same ideas or of the objects to which the ideas are referred. Four laws of recall have been generally accepted. There is some warrant for the statement that Aristotle originally formulated them, but they were given their wide acceptance by the English Associationist school from Hume to Mill and Bain. The laws assert that ideas succeed each other in consciousness if the objects that they represent have been (*a*) perceived together (association by contiguity), or (*b*) in immediate succession (association by succession), or (*c*) are similar (association by similarity), or (*d*) contrast with each other (association by contrast). These laws correspond to the actual observation of the course of thought, but recently there has been very general skepticism as to whether they afford any explanation of the succession of ideas. Very evidently the laws of contiguity and succession are on a different level from the laws of similarity and contrast. Contiguity and succession are easily established and definite; similarity and contrast are of varying degrees and uncertain. It is much easier, too, to see how the first two factors should exert an actual influence than the latter two. The difference between the two groups was recognized by the associationists in that they made the one explain the more mechanical connections while the more rational mental processes were explained by similarity.

The recent discussions of association have shifted the emphasis from description to explanation. Not the order of ideas superficially regarded, but the underlying causes of the succession, have been prominent. Consequently the nervous basis of association has had large place, for at present ideas are not regarded as persistent entities in themselves. What persists is the potentiality or tendency to act of the nerve cells at the basis of the idea. Sherrington and his school refer the association to some change in the contact of end-brush and dendrite of the neurone that they call the synapse. Association would be defined as a change in the synapse wrought by the simultaneous or successive action of the two neurones. Since every idea is really very complex, many cells and many synapses would be involved in each. On the accepted theory the formation of associations would consist in some change in the synapses of two neurones or groups of neurones, and the process of recalling one idea would be to have one of the two groups excited, which would lead to the transfer of the excitation across the synapse to the other neurone. When the word "apple" suggests "tree," it would be explained that the neurones that were concerned in hearing the two words had become connected at their synapses through frequent use in succession, and that now when the cell corresponding to "apple" was excited, the excitation spread to the other cell that corresponded to "tree."

These more fundamental explanations of association have made it necessary to distinguish even more sharply than the earlier theorists between association by contiguity and succession and association by similarity or contrast. Simultaneous or successive action of two neurones can easily be understood to produce a change in the synapse that would make one recall the other, but no direct change of the kind can be ascribed to similarity or to contrast as such. Two general ways have been followed to dispose of associations by similarity and contrast. One, advocated by Ebbinghaus among others, would argue that similar and more particularly contrasting ideas are associated, not because they contrast or are similar, but because the objects that were similar or contrasted have also been at some time contiguous or have succeeded each other. Light and dark, for example, contrast, but they recall each other on this theory because they are frequently associated in perception, not because of the contrast. Wundt and James, among others, explain association by similarity as due to the presence of identical elements that account at once for the recall through contiguity and for the fact that the ideas that recall one another are similar. Both men rest their interpretation upon the fact that while the object is regarded as a unit, the idea that represents it must be thought of as composed of a number of different units, or at least that many neurones must be active when the idea is in mind. Association between ideas that are seen to be similar when examined after they have been in consciousness are recalled not because they are similar, but because they have in common some group of elements that constitute a center about which the ideas may be said to disappear and reappear. Many of the elements of the first idea disappear, leaving only this center, and the center itself recalls other elements with which it has been earlier associated and these with it constitute the recalled idea. On the nervous side this means that many of the mass of neurones originally excited cease to act, that certain ones persist, and that the excitation spreads from them over the synapses prepared by earlier connections to other neurones that have also been excited simultaneously with them at some earlier time. Since certain of the elements in the two masses are common, the two ideas will be similar. Wundt calls association of this kind "association by identity"; James gives the process the name of "focalized recall." Bradley uses the term "associative redintegration." Whatever the name assigned, and whether we agree that the process is or is not identical with the association by similarity of the older school, there can certainly be no doubt that the greater number of associations actually observed are of this sort.

One important difficulty with the doctrine of association of the older theorists that has been recognized more and more recently is that the mental operations are more variable than the theories would admit. Strictly applied, there could be but one association that is most strongly connected with any other, and this should follow the other invariably. As a matter of fact, weaker associations are continually gaining the mastery over the stronger; ideas frequently associated are often subordinated to those that have been seldom connected with the inciting idea. The older writers made a place for this by making associations by similarity more flexible than association by contiguity or succession. Rational connections were grouped under similarity, the mechanical connections under the two first heads. In the modern discussions the selection of one from the many possible associates is made to depend either upon an arbitrary force that is called the "self," "will," or, by Wundt, "apperception," or is referred to the wider relations of the idea to other ideas and considerations that may be present at the moment. Watt and the Külpe school, for example, find the controlling influence in the task of the moment, in the general purpose; others call the control from the wider setting the "attitude" or the cortical set. Whatever we call it, or however it may be explained in the last analysis, it is now a matter of general agreement that most associations are to be explained in large part by mental states that are wider than the immediately preceding idea, and that this wider control accounts for the flexibility of association and for the adaptability to particular conditions. Not the state of the single synapse, but the activity of wide areas of the cortex; not the condition of the neurones at the immediate moment, but the activity of the nervous system over considerable periods, determines the final outcome of the associations.

As one would expect from the many changes in point of view, there have been many different classifications of associations. Some of the more important may be mentioned and referred to the general outline given above. Wundt, for example, distinguishes associations between elements from the same sense department from elements derived from different senses. The former he calls *assimilations*, the latter, after Herbart, *complications*. Assimilations are found most frequently in illusions or in normal perceptions. The contributions of the senses are supplemented by memories from the same sense to constitute the object seen. Complications are found in the supplementing of tactual impressions by visual impressions, as when one feels an object in the dark. Other classifications emphasize the difference between the mechanically determined and the more rationally determined associations that we have seen to grow out of the entire appreciation of the situation. Two of the more common classifications are into *external* and *internal* associations, or into *divergent* and *convergent* associations. The former is used more widely by psychiatrists. The flight of ideas of a maniac, or the substitution of a word with strong associations but without meaning in the context for another that should logically follow it are instances of external association; the associations of orderly thinking are due to internal associations. "Divergent" and "convergent" are used by Sully and others in place of "external" and "internal." Divergent associations spread from the initial word and depend upon that word alone; convergent associates come from the word plus other elements of experience which converge upon the resulting idea to assist in arousing it. W. B. P.

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ASSOCIATION. — The second of the four steps of the recitation or inductive development lesson as originally suggested by Herbart. By the step of association, Herbart meant to indicate the stage in which the various particulars or details are associated through the discovery of common qualities. In present terminology it is the step of "comparison and abstraction."

See Recitation, Method of.

ASSOCIATION AND REPRODUCTION OF IDEAS. — See Association.

ASSOCIATION OF CATHOLIC COLLEGES OF THE UNITED STATES. — Organized in Chicago in 1899 under the guidance of Right Reverend Monsignor Thomas J. Conety, D.D., rector of the Catholic University. The purposes of the association are to study the questions connected with college education, to advance the unification of system of Catholic education, and to strive toward a larger development of college work. Representatives from 53 colleges joined in the first organization of the association. The association now includes about 90 colleges, conducted chiefly by religious teaching orders of men as follows: Augustinians, Benedictines, Capuchins, Carmelites, Order of Charity, Christian Brothers, Franciscans, Franciscan Brothers, Holy Cross, Holy Ghost, Jesuits, Marists, Society of Mary, Precious Blood, Brothers of the Sacred Heart, Saint Viateur, Vincentians, and the Zaverian Brothers. The colleges of this group range from classical to commercial institutions created to meet the demands of those destined for the priesthood, the learned professions, and business careers. No uniformity of entrance standards exists.

See Convent Schools; Religious Teaching Orders; Monastic Schools; etc.

ASSOCIATION OF COLLEGES AND PREPARATORY SCHOOLS OF THE MIDDLE STATES AND MARYLAND. — This organization has developed by successive stages from an organization of college teachers, founded in 1888, into an important body representing college and secondary school interests; only approved schools are admitted to membership. At its annual meetings (in the Thanksgiving holidays) are discussed topics bearing on the relations of bodies of colleges and the secondary schools; the speakers selected represent the college and the school point of view. The presiding officer is in alternate years a college professor or a school principal. The proceedings published annually contain notable utterances on vital educational issues; in them may be traced the inception and progress of important educational measures. Thus the College Entrance Examination Board, which in 1909 examined by a uniform system over 3400 candidates for admission to college, originated in the counsels of the Association, to which it owes its present influence. Similarly the Association has coöperated through committees with other organizations in unifying and strengthening the college entrance requirements in English; from the Association have sprung several adjunct societies, that meet as sections of the parent society, *e.g.* A History Teachers' Association, and a Classical Teachers' Association. J. S.

See College Entrance Examination Boards.

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ASSOCIATION OF COLLEGES AND PREPARATORY SCHOOLS OF THE SOUTHERN STATES. — See College Examination and Certification Boards.

ASSOCIATION OF COLLEGIATE ALUMNAE. — See Women, Higher Education of.

ASSOCIATION OF IDEAS. — See Association.

ASSOCIATION INSTITUTE, CHICAGO, ILL. — A day and evening school for men and boys conducted by the Central Department of the Y.M.C.A. (*q.v.*) and organized in 1893. The range of work offered is from elementary to collegiate grade. Its evening school is one of the largest in the country, and in 1908–1909

80 or more classes were conducted, while the enrollment was 1149 students. In the same year, the day classes, which were begun in 1896, enrolled 414 students. The Institute frankly aims at being supplementary to other schools and to give the student what he needs. Business, college preparatory, and technical courses are the most important of those offered. The certificates of this institute are recognized by many colleges, universities, and professional institutions. No students are admitted under 15 years of age. A summer school for grammar school boys and an English school for those who have not completed the grammar schools are also provided. J. Goodwin Perkins is the educational director.

ASSOCIATIONS. — See Educational Associations; Teachers' Associations.

ASSOCIATIONS, SCIENTIFIC. — See Scientific Associations.

ASSOCIATIONS, TEACHERS'. — See Teachers' Associations.

ASSOCIATIONS, TEACHERS' VOLUNTARY. — See Teachers' Associations.

ASSUMPTION COLLEGE, SANDWICH, ONT. — A Catholic school established in 1857 by the Jesuit Fathers, but which has successively passed into the control of the Benedictines and Basilians, who now have charge. Preparatory, classical, and commercial departments are maintained. The classical course is one of 7 years. Rev. F. Forster, C.S.B., is the president.

ASSYRO-BABYLONIANS, THE EDUCATION OF THE. — Inasmuch as the civilization of the Assyro-Babylonians was based, even more than that of other peoples of antiquity, upon the quality and extent of their learning, an exhaustive paper on this subject should necessarily cover in detail the entire field of their national culture, besides embracing such material as might be at hand regarding their pedagogic methods. As such a presentation *in extenso* is obviously beyond the limits of the present treatise, it must suffice here merely to touch very briefly, first, upon the scope and quality of the Assyro-Babylonian learning, and secondly, upon its extent among and influence upon the various classes of the people of Assyro-Babylonia, who, for our purposes at least, may be looked upon as a single nation, because, during the whole period of their history, either one or the other of these two kindred powers held the Semitic hegemony of Western Asia.

It may now be regarded as an established thesis that the primitive civilization of Babylonia (the mother of the subsequent Assyro-Babylonian culture) was not Semitic, but that it was the product of that non-Aryan, non-Semitic, linguistically agglutinative race of people, whom we now agree to designate as "Sumerians,"[1] who were undoubtedly the founders of the cuneiform or wedge writing, in which in later days arose the vast treasury of the Assyro-Babylonian Semitic literature. All primitive education, or civilization, for the terms are really synonymous in relation to ancient times, was mainly dependent upon the character of the system of writing upon which it was based. It is clear that the cuneiform system of writing originated as a lineal picture writing, scratched at first upon stone and later upon clay, each sign having primitively been the picture of an object, which sign was later conventionalized as the writing became more cursive. To each such sign picture was attributed as a syllabic value the Sumerian word, practically always monosyllabic, denoting the object represented by the picture. Thus, to the sign for "water," which was originally the picture of a falling stream, was assigned the value *a*, which was the Sumerian word for "water," and when, in later times, the invading Semites adopted the Sumerian characters, they used the sign with the sound *a*, quite irrespective of its meaning in Sumerian as "water," in order to denote the same sound *a*, wherever it occurred in the Semitic Assyro-Babylonian language. In other words, the original monosyllabic Sumerian words came to serve as simple syllable values, to spell out Semitic vocables syllabically. This system naturally soon developed into a regular syllabary, consisting of such values as *ba, ab, da, ad*, etc., but never into a consonantal and vocalic alphabet, such as we use to-day. Then, as the necessity for abbreviated writing became apparent to the cuneiform scribes, they complicated still further their method of recording by frequently adopting the original Sumerian idea sign, or ideograph, as it is now called, and pronouncing it with the corresponding Semitic word. Thus, in the case of the water sign, pronounced in Sumerian *a*, if the Semitic scribe wished to write "water" more expeditiously, he used the Sumerian *a* sign = "water," but pronounced it in Semitic *mû* "water," rather than spell it out syllabically, *mu-u*. On the other hand, the scribe was at perfect liberty to use the Sumerian water sign, with the value *a*, in spelling out phonetically any Semitic word which contained that value. An Assyro-Babylonian reader, consequently, had always to ask himself whether the signs were being used ideographically, or merely phonetically; a circumstance which materially complicated the difficulties of cuneiform reading. With a system of writing which embodied, besides the ninety simple syllabic signs, some

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[1] On the Sumerian language, cf. J. Dyneley Prince, *Materials for a Sumerian Lexicon*, J. C. Hinrichs'sche Buchhandlung, Leipzig, 1908, pp. VII–XXXIV.

12,200 possible ideographic combinations,[1] it is most surprising that such an elaborate literature, both religious and secular, should have been developed by this remarkable people.

Their religious literature embraced a large amount of devotional ritual, such as psalms, hymns, and prayers to the various gods, usually written in both Sumerian (first line) and Semitic (second line), which were employed in the worship of the different temples.[2] Besides these, they recorded a number of historically important religious and semi-religious legends, the most noteworthy of which are the Creation Story[3] and the so-called Nimrod Epic,[4] embodying their Deluge account, which is strikingly similar to that of the Hebrew Old Testament. Important also were the Adapa and the Zu stories; both of them complicated nature-myths.[5] All these legends are highly valuable to-day from the point of view of the study of the development of religious thought, as showing that the Assyro-Babylonians evolved, during the three thousand years of their national growth, a very well-ordered religious system.

A further branch of this their religious activity was also, undoubtedly, their evolution of an elaborate system of astronomical observations, which they, of course, used chiefly for astrological purposes, many of which records we find carefully inscribed in the cuneiform literature.[6] Indeed, the early Babylonian and Assyrian astronomical facts, particularly regarding the grouping of the constellations, which they believed augured good or ill for mankind, form the basis of all later astronomical work. For example, in connection with their astronomical and astrological activity, they established the seven-day week, and also worked out the basis of ordinary mathematical reckoning, founded at first upon the sexagesimal, and later upon the decimal, system, of which they were the inventors, so that in a sense we may look upon them as having been the fathers both of astronomy and of mathematics in general.

Then, too, as the Assyro-Babylonian political influence extended practically all over the nearer East, they became great traders, both at home and abroad, and accordingly evolved a system of keeping accounts, which, considering the difficulty of their writing and the perishable nature of their writing material (usually baked clay), is little short of marvelous. Their alluvial land, especially in Babylonia, supplied them with little or no stone. Both the temple and the private accounts and contracts, thousands of specimens of which, preserved on cylinders and tablets, some of them encased in clay envelopes, have come down to us, bear witness of their immense commerce and business activity.[1] They also very naturally evolved a system of law, based both upon their religion and their commerce, which was certainly not equaled in later days even by the Hebrews. The now famous laws of the Babylonian King Hammurabi (2342–2288 B.C.) form a master monument of the legal acumen and sense of justice of these highly civilized ancient peoples.

Finally, in this connection, their royal and governmental epistolary literature,[2] such as correspondence between kings and governors, and their carefully kept reign records, the events of each year being tabulated according to their proper sequence, gave them an immense purely historical collection of literature.

The student of education is bound to consider what a vast quantity of instructional subjects the Assyro-Babylonians had to handle, the nucleus of it certainly dating from 2342–2288 B.C., the era of Hammurabi, and, of course, constantly increasing in material down to the culmination of the later Babylonian power under Nebuchadnezzar (604–562 B.C.). They had, without doubt, hundreds of students in every temple; for the temples were their centers of educational activity until the end of their dominion in 537 B.C., when Cyrus the Persian took the city of Babylon and thus ended the Semitic sway in western Asia. These students, in the later days, when the educational material had reached vast proportions, must have specialized in the various lines of mental activity. That is, there must have been students of the purely religious literature (belief and ritual); of the astronomical and astrological documents, a difficult specialty in itself to-day; of their very large epistolary literature; of the historical records; and finally, of their widespread business documents, and of what practically amounted to their system of banking.[1] Certainly no other people of the ancient East had a broader field for educational activity than had the Assyro-Babylonians. Indeed, it was owing to the excessive intellectual activity of the last King of Babylon, Nabonidus (556–537 B.C.), who was more of a scholar than a ruler, and who, owing to his purely scholarly trend of mind, permitted the Babylonian name in western Asia to become more of a shadow than a reality, that Babylon, then the center of Semitic power, finally fell into the hands of the alien Cyrus in 527 B.C.

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[1] For an inductive textbook for beginners in Assyrian, cf. J. Dyneley Prince, *Assyrian Primer*, Columbia University Press, 1909.

[2] A large number of these hymns and psalms has already been published in various European languages by Messrs. Thureau-Dangin, Zimmern, Bezold, Langdon, Vanderburgh, Prince, and other Assyriologists. The student should consult the recent files of the *Journal of the American Oriental Society*, the *American Journal of Semitic Languages*, the *Journal Asiatique*, the *Zeitschrift für Assyriologie*, and the *Wiener Zeitschrift für Kunde des Morgenlandes;* also F. A. Vanderburgh, *Sumerian Hymns*, Columbia University Press, 1908.

[3] Cf. L. W. King, *The Seven Tablets of Creation*, Luzac, London, 1902.

[4] Cf. Paul Haupt's text, *das Babylonische Nimrodepos*, 1891, and partial translation, *Johns Hopkins University Circulars*, Vol. VIII, No. 69, pp. 17–18; also in *Beiträge zur semitischen Sprachwissenschaft*, Vol. I, pp. 122 ff. See also P. Jensen, *Die Kosmologie der Babylonier*, pp. 368 ff. On the recently discovered Deluge fragment, edited by H. V. Hilprecht with translation in the Babylonian Expedition of the University of Pennsylvania, Vol. V, No. 1, see the review by J. Dyneley Prince and F. A. Vanderburgh in the July number of the *American Journal of Semitic Languages*, 1910.

[5] See Morris Jastrow, Jr., *Religion of Babylonia and Assyria* (English edition), Index, *s.v.* "Adapa" and "Zu."

[6] Cf. Virolleaud, *L'Astrologie Chaldéenne*, Paris, 1908–1909; C. Fossey, *La Magie Assyrienne*, Paris, 1902.

[1] Cf. J. H. Stevenson, *Assyrian and Babylonian Contracts*, American Book Company, 1902; Robert Lau, *Contract Tablets*, Columbia University Press, 1905.

[2] See L. W. King, *Letters and Inscriptions of Hammurabi*, Luzac, London, 1898; R. C. Thompson, *Late Babylonian Letters*, Luzac, London, 1906.

We know very little regarding the Assyro-Babylonian system of instruction, as they have left us comparatively few records of a purely educational character, but we may certainly be permitted to take for granted the following facts. As stated above, the temples, each of which was usually the religious and often the political center of its district, were also the educational centers for the instruction of the scribal and priestly caste. It cannot, of course, be supposed that education was ever spread broadcast among the population, as is the case to-day in the West, the chief hindrance to such a condition, no doubt, being, not only their system of social classes, but also the extreme difficulty of learning the dual system of cuneiform writing described above. Indeed, this cause holds good to-day to a great extent in the entire Orient, where the literary languages, as is the case with Arabic, Persian, and Turkish, have been developed along quite different lines from the vernaculars. Judging from the conservative East of to-day, it may be supposed that this was particularly the case in Assyro-Babylonia, where every scribe had to learn how to read and write not only the Semitic vernacular, but also the ancient Sumerian language, which remained the religious idiom of the temple service down to the latest date, the tongue in which probably all devotional rites were carried on. In short, Sumerian must have occupied much the same position among the Assyro-Babylonians as was held by Latin in our own medieval period. This seems clear from the fact that we have a large number of what were evidently purely educational documents intended to enable the students to master the intricacies of Sumerian; such as lists of grammatical forms with Semitic explanations and lists of words explanatory in both languages of the proper values of the ideographic signs. We know also that much the same methods which are followed by our own Assyriological students of modern times were used by students in Egypt at the time of the so-called Tell el-Amarna correspondence in the Babylonian language between early Babylonian kings and Egyptian monarchs and governors (*c.* 2200 B.C.); viz., the learner divided his words by means of lines drawn upon the tablets, in order to get the proper grammatical divisions. Furthermore, the very large bilingual hymn literature may be classified as educational in its nature, where the Sumerian line has the corresponding Assyro-Babylonian translation directly under it. It must be supposed that such documents as these were written especially for the purpose of familiarizing the young priesthood with the character of the hymns in question. It is probable also that they had educational, astronomical, and astrological tablets, as well as purely arithmetical tablets, intended to teach the students the principles of the multiplication table, as instanced by the recent Nippur discoveries of what are apparently very simple examples of multiplication.[1] This implies that they began to instruct students at quite an early age. Then, too, the hitherto unmentioned incantation literature,[2] giving in both Sumerian and Assyro-Babylonian all sorts of medicinal charms against every kind of disease, may be classified as instructional documents to the youthful medical fraternity, which was always a caste of the priesthood. The extremely numerous scribal copies of every kind of historical record, made by the orders of the last great King of Assyria, Assurbanipal (668–626 B.C.), must, no doubt, be placed in the same educational category.

In short, it is perfectly clear that these people paid especial attention to the education of their scribal or learned class, but it is equally probable that education was looked upon, not as a universal necessity, — this has never been the case in the East, — but as belonging to a particular set of specialists, whose duty it was to maintain it for the welfare of the nation as a whole. There is nothing to indicate that this scribal caste[3] was drawn in later days from any particular racial or aristocratic class. No doubt any intelligent free-born lad was permitted to dedicate his talents to this necessary branch of the nation's activity and to become either a conservator or enricher of their literature, religious or legal, or else a public accountant for the maintenance of their commerce. Only, every such scribe was, without doubt, a member of the priestly orders, who were, as in our own Middle Ages, the conservers of all learning. In very ancient days, however, it seems that this priestly scribal class was largely recruited from the Chaldeans, a Semitic race kindred to the Babylonians, who came first from the South along the coast of the Persian Gulf at a very early date. Herodotus used the term "Chaldeans" to denote essentially the priestly class of Babylonia, a usage which became current in later times among all peoples foreign to the Assyro-Babylonians, and which is probably to be explained in the following manner.[1]

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[1] Clay, *The Business Documents of Murashû Sons*, Babylonian Expedition of the University of Pennsylvania, X.

[1] H. V. Hilprecht, *Explorations in Bible Lands*, Philadelphia, 1903, p. 531.

[2] R. C. Thompson, *Reports of the Magicians and Astrologers of Nineveh and Babylon*, Vols. I, II, Luzac, London, 1900; *The Devils and Evil Spirits of Babylonia*, Vols. I, II, Luzac, London, 1907.

[3] On scribal caste in general, and particularly among the Hebrews, cf. J. Dyneley Prince in Cheyne's *Encyclopædia Biblica*, *s.v.* "Scribes and Pharisees," cols. 4321–4332.

The sudden rise of the later Babylonian empire under the Chaldean rule of Nebuchadnezzar, the son of Nabopolassar, the first of the later purely Chaldean dynasty, tended to produce so thorough an amalgamation of the Chaldeans and Babylonians proper, who had theretofore probably been racially distinct, that, in the course of time, no perceptible differences existed between these two Semitic peoples. The name "Chaldean," however, lived on in the restricted sense of the priestly educated caste, and for this reason. The Kaldi had seized and held from most ancient times the region of old Sumer in southern Babylonia, the early center of the non-Semitic Sumerian culture. This superior civilization these Chaldeans adopted eventually as their own, and, as they were the dominant race, the priestly caste of that region became a Chaldean institution. It is reasonable to conjecture, then, that southern Babylonia, the home of the old culture, supplied Babylon and other important cities with priests and scribes, who were correctly termed "Chaldeans" from their original descent, a name, however, which in later days, owing to the amalgamation of the Chaldeans and Babylonians, lost its national force and became a distinctive appellation of the priestly caste.

It is really marvelous that we are able to-day to formulate as many facts as we do regarding the ancient Assyro-Babylonian civilization. After lying buried for over two thousand years beneath the ruin-hills of Babylonia and Assyria, the records of this great culture of the ancient East have come to light practically within our own times, and have given us an insight into some of the most minute details of their public polity and even of their daily life. Like the valley of dry bones mentioned by the Prophet Ezekiel (37, 7), before the creative breath of modern Assyriological science, there have arisen "a noise . . . and a shaking, and the bones have come together, bone to his bone." J. D. P.

ASTASIA-ABASIA. — The loss of the ability to stand and to walk, without corresponding losses of the sensations which help to coördinate the movements in walking and standing, and without paralysis of the walking and standing muscles. The condition is usually found only in hysterical patients. Bloch, who first described the symptom, explained it as being due to a faulty initial impulse from the cerebral cortex. It is one form of amnesia (*q.v.*). S. I. F.

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ASTELL, MARY (1668–1731). — Writer on miscellaneous topics. She was the daughter of a Newcastle merchant who gave her a careful education. When about 20 she settled in London, where and at Chelsea she passed the rest of her life. When she was 26, she published anonymously a *Serious Proposal to Ladies*, in which she advised the erection of a sort of Church of England nunnery, without vows, in which religion and education should go hand in hand. In 1697, the year in which Defoe complained that Mrs. Astell had anticipated some of his ideas, she published a second part, giving a method for the improvement of the minds of the recluses. Bishop Burnet is said to have persuaded some great lady, who had been taken by the scheme, not to endow the institution because it savored too much of popery. Years later the *Tatler* in an unworthy fashion satirized the proposal and its estimable author. Her other writings, political and ecclesiastical, are of consequence mainly because they prove her to have been a woman of considerable acuteness, who did not hesitate to engage on equal terms with men like Atterbury and John Norris of Bemerton. An exception should be made in favor of her *Essay in Defence of the Female Sex* (1696) and *Some Reflections upon Marriage* (1700), the former of which contains not a little vigorous satire upon the sex to which this good and able, but somewhat eccentric, lady did not belong. Mrs. Astell is not much remembered, but a careful monograph dealing with her and other women writers of her day, *e.g.* Mrs. Elizabeth Elstob, the Anglo-Saxon scholar, is much to be desired. I have relied on Canon Overton's article in the Dictionary of National Biography, Ballard's *Memoirs of British Ladies*, and my own notes. W. P. T.

ASTEREOGNOSIS. — Loss of stereognostic sense (?) is the inability to decide from touch and motor sensations the nature and use of objects. If when the eyes are closed a pencil or a coin be placed in the hand of a normal person, there are obtained sensations of hardness, of temperature, and complex perceptions of roundness, of length, etc., which are interpreted by the individual to mean respectively a pencil or a coin. In the condition of astereognosis the interpretation of the different sensations is not possible, although many of the sensory organs may be as acute as in a normal individual. The disorder is produced by lesions in the parietal cerebral cortex, and may be unilateral.

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[1] J. Dyneley Prince, *Commentary on the Book of Daniel*, J. C. Hinrichs'sche Buchhandlung, Leipzig, 1899, pp. 59–61.

Although the term is used in many articles as if it referred to a sensation loss, it is well known that the so-called stereognostic sense is a complex of sensational elements, of the nature of an association, and astereognosis is, therefore, a loss of certain associations, and may be directly compared with the various kinds of aphasia.

Astereognosis is normal in young children, inasmuch as they cannot recognize by means of touch and movement sensations the nature of objects which may be given to them. The sense may be much improved by systematic training. S. I. F.

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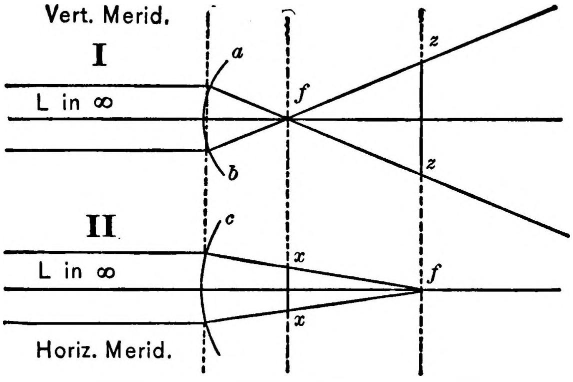
ASTHENIC EMOTIONS. — See Emotions.

ASTIGMATISM (ἀ- privative and στίγμα, a point). — That condition of refraction in which parallel rays of light entering the eye do not come to a focus at the same point on the retina. The defect is due to an error in the refracting surface either of the cornea, or of the lens, or of both, or in their setting. Astigmatism was first discovered more than a hundred years ago by Thomas Young, who was astigmatic himself. He noted this defect in his own case but thought it due to the lens of his eye. It was not until many years later that Donders showed that astigmatism usually results from an error of refraction in the cornea.

There are two kinds of astigmatism, regular and irregular. The irregular form occurs when the same meridian of the cornea or the lens varies in curvature, that is, has an unequal refraction in its different parts. This may be congenital, or due to ulcers, nebulæ, or the like. Regular astigmatism is caused by a curvature of the cornea that varies so that one meridian has a greater refraction than another at right angles to it. These are called the chief meridians. Regular astigmatism may be corrected by cylindrical lenses; irregular astigmatism cannot be corrected, but may sometimes be ameliorated by stenopaic spectacles. One form of this trouble due to disease could be prevented by proper cleansing of the newborn infant's eyes.

Regular astigmatism, caused when one meridian has greater refraction than another, Donders has shown, is in most cases due to differences in refraction of the cornea, and that in the majority of cases the vertical meridian, or one lying near to the vertical, has greater refraction than the horizontal. This has been well illustrated by comparing the ordinary astigmatic eye to an egg, or, more accurately, the cornea to the segment of an egg. If we call the meridians running lengthwise of the egg horizontal meridians, and those running the other way vertical, then the egg usually has a greater curvature on its vertical than on its horizontal meridians. The astigmatic cornea has a similar curvature. In some cases, however, the horizontal meridians have a greater degree of refraction than the vertical. Thus the regular astigmatism is of two kinds: first, the common form where the refraction is greater in the vertical meridian than in the horizontal, called normal astigmatism; and, second, the condition where the refraction is greater in the horizontal than in the vertical meridian, or the so-called perverse or inverse astigmatism. The so-called normal astigmatism (astigmatism "according to the rule" of French and English writers) is the most common form. The inverse or perverse astigmatism (astigmatism "contrary to the rule" of French and English writers) is relatively rare.

The accompanying cuts illustrate the refractive condition of the ordinary astigmatic eye.



Astigmatism : Vertical (I) ; Horizontal (II).

I represents the condition of the vertical meridians, II that of the horizontal meridians. Parallel rays of light coming from the point *L* strike the cornea, are reflected by the more sharply curved meridian *ab* and come to a focus at *f*, and then diverge again. In II the rays of light from *L* are reflected by the slightly curved meridian *cd*, and do not come to a focus until they reach the point *f*. At *xx*, the line on which lies the focus *f* of the vertical meridians, the rays of light from *L* make merely a blurred image. It is the same at *zz*, the line on which lies the focus *f* of the horizontal meridians.

In recent years especially important investigations of this condition in the eyes of school children have been made by use of the ophthalmometer. Among these, especially interesting are the investigations by Dr. Stocker and Dr. Steiger in Switzerland. In 1895–1896 Dr. Stocker tested the vision of 2307 school children in Lucerne — 1132 boys, 1175 girls. Differences of refraction of less than a quarter of a diopter were not reckoned (a diopter being a degree of refraction equal to that of a lens whose focus is at a distance of one meter. See article on the

EYE, HYGIENE OF). Only 77, that is, 3.3 per cent of all the children tested had a perfectly symmetrical cornea in both eyes. In the case of 185 children one eye was normal. Altogether only 339 eyes were free from astigmatism, that is, 7.3 per cent of the eyes were found to be symmetrical. The minimum degree of astigmatism was .25 diopter, as nothing less than this was reckoned; and the maximum degree of astigmatism was 7 diopters. Among the girls he found not only a greater number of astigmatic eyes than among the boys, but the degree of astigmatism was on an average greater in case of the girls.

Careful investigations have been made also for many years by Steiger in Zürich and Bern. During the years 1894–1903 a total of 25,995 school children between the ages of 6 and 7, or sometimes between 7 and 8, were tested. Among these 7736 were referred to Dr. Steiger for special examination. Of these 5195 were found to be definitely abnormal, and about half, 2406, were astigmatic in one or both eyes.

According to Steiger's investigations more than half of those children with deficient vision owe this condition solely or chiefly to astigmatism, and all other factors together have less influence than this one defect. Miss Barrington and Karl Pearson find that astigmatism stands next to myopia as a cause of defective vision.

Not only is the vision likely to be affected by astigmatism, but a long list of disorders follows as a result of the incident eye strain. The symptoms are familiar to every competent oculist. It is one of the chief causes of nervous headache, dizziness, nausea, and functional disorders of digestion, and neurasthenia or nervous weakness. Many inflammations of the cornea are said to be due to the continuous contraction of the ciliary muscle in trying to overcome the defect by accommodation. And in like manner inflammations of the eyelids and the conjunctiva are often due to this, and are cured by fitting with suitable glasses.

While our knowledge of astigmatism is of recent origin, the fact of astigmatism must have been as old as scholarship itself. Dr. Gould has attempted to diagnose the defects of a group of literary men and men of science from the data left by their journals and the like, and it is his belief that Carlyle, Darwin, Huxley, George Eliot, Herbert Spencer, Wagner, Nietzsche, and a number of others were chronic sufferers from eye strain, and that most of their physical troubles, headache, depression, nervousness, indigestion, and the like were due primarily to eye strain. While Dr. Gould probably exaggerates and ignores the influence of other factors in making his diagnoses, he does make out a pretty good case as regards a number of these writers. And he is right in maintaining that the discovery of astigmatism was one of the greatest medical discoveries of the last century.

The invention of the ophthalmoscope and the ophthalmometer made more accurate tests of the human eye possible. And among the results found by using these instruments was the discovery that few if any eyes are perfectly symmetrical. Although Dr. Stocker ignored all cases of astigmatism where the error of refraction was less than a quarter of a diopter, he found only 7.3 per cent of the eyes of the school children examined free from astigmatism. Now if practically everybody has at least one eye more or less astigmatic, the serious question is what degree of astigmatism should be corrected by the use of cylindrical lenses. The answer is an individual one. A considerable degree of astigmatism is often corrected by the muscles of accommodation without apparent injury to health, and on the other hand in many cases of slight astigmatism, half a diopter or less, great advantage comes by correcting the error of refraction. Many cases have been reported where headache and serious nervous disorder were greatly relieved by correction for such slight astigmatism. No general rule can be laid down, but in all cases where children are nervous and suffer from headache, indigestion, and the like, a competent oculist should be consulted and the question decided in view of the conditions of the individual case.

The correction of astigmatism by the use of cylindrical lenses seems not to have been made in this country before 1872. The importance of correcting this defect, however, was soon recognized and emphasized by Weir Mitchell, but it is only still more recently that the hygienic importance of making tests for astigmatism in the schools has been recognized. Although Javal, the great French ophthalmologist, had shown the significance of the subject, Cohn, even in the second edition of his *Hygiene of the Eye*, published in 1892, said that its investigation and diagnosis had little importance for school hygiene.

Recent investigations emphasize the great importance of making tests for astigmatism in the case of all school children. Unfortunately in many schools of this country, even where tests for myopia and hyperopia are made, tests for astigmatism are omitted. It is extremely desirable that a system similar to that employed in Zürich should be adopted. In that city at the beginning of each new school year all the pupils of the beginning class have their eyes tested by the city physicians. All pupils not having normal acuity of vision, and suspicious cases, are referred to an ophthalmologist, Dr. Steiger, for special investigation.

The results of correcting the defects by suitable glasses are often remarkable. The child who has suffered from dizziness, headache, nausea, indigestion, and shows perhaps general symptoms of anæmia, becomes comfortable, free from nervousness, and capable of doing school work without discomfort.

The recent scientific study by Miss Barrington and Karl Pearson, as well as the investigations of Steiger, show that regular astigmatism, like other conditions of refraction, is inherited. No satisfactory evidence that the defect is caused by the conditions of school environment has been found. W. H. B.

See articles on the EYE, HYGIENE OF; MYOPIA; HYPERMETROPIA.

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ASTROLOGY. — The study of the relative positions of the heavenly bodies, especially of the sun, moon, planets, and twelve signs of the zodiac, with a view to determining the course of human affairs, whether of individuals or nations. Astrology would appear to have been first elaborated into a system by the Semitic Chaldeans about a thousand years before our era, and it is to their sexagesimal method of reckoning that we owe our division of the circle into 360 degrees and the division of the degree and the hour into minutes and seconds. This pseudo-science of the stars, allied with magic on the one hand and with astronomy on the other, underwent various modifications and adjustments as it spread westward into Greece and Egypt. The astrological works attributed to the celebrated geographer and astronomer, Ptolemy (*q.v.*), who lived at Alexandria in the first half of the second century, summed up the subject in a scholarly spirit. These works fell into the hands of the Arabic astronomers and through them reached France, Italy, Germany, and England in the thirteenth century. Astrology continued to flourish in western Europe for four centuries or more, taking on a sufficiently Christian air to be heartily approved by such thoughtful persons as Roger Bacon (*q.v.*) and Melanchthon (*q.v.*).

Few ideas are more natural or persistent than the belief that the heavens influence earthly events. It is clear enough in the case of the sun and moon, why not in that of the planets too? Then the Middle Ages held, with Aristotle, that the heavenly bodies were angelic in their nature, not mere huge masses of rock, vapor, or glowing gases, as we conceive them. Accordingly even the most learned long accepted the main presuppositions of astrology, however bitterly they might denounce the arrogance and preposterous claims of the professional astrologer, who often bore a strong resemblance to a magician. Astronomy always existed alongside of astrology and was based mainly on the remarkable *Almagest* of Ptolemy, in which he gives the chief results of the work of Hipparchus and earlier investigators. "Natural" astrology dealt with the influences of the heavens on the earth itself and had some affinity with meteorology; "judicial" astrology had to do especially with the fate of individuals. The fundamental principle of judicial astrology was based on the assumption that all things were composed of the four elements, earth, air, fire, and water. Every man's character is due to his *temperamentum*, that is to say, to the admixture of the four elements in his particular case, and this admixture is largely determined at the time of his conception in the womb and at the moment of his birth. Now, if it be assumed, that the heavenly bodies inevitably exercise an influence on the earth, the temperament of an individual, his natural aptitudes, and his probable fate can be forecast, at least in a general way, by ascertaining the particular situation of the sun, moon, and planets in the zodiac at the time of his conception and of his birth. Roger Bacon, who devotes an important section of his *Opus Majus* to the subject, declares that no prudent astrologer will undertake to guarantee his forecasts, but will confine himself to a consideration of the way in which the body is modified by the heavens, and in its turn excites the mind to public and private acts, just as external sights and sounds are seen to rouse men's passions and ambitions. For are not the heavens and the stars more potent to affect the bodily organs than the lower phenomena of sight and hearing? The prognostications of the astrologer were, therefore, at best warnings based on the discovery of a person's "complexion"; it was unsafe to prophesy particular events, since many allowances must always be made for errors in the highly intricate calculations, for the exercise of free will and acts of God. The influences ascribed to the individual heavenly bodies were traditional, but subject to varying interpretations — Jupiter and Venus were auspicious; Saturn and Mars boded ill; Venus was connected with the joys of this life, Jupiter with those of the next. One born under the influence of Venus should be on his guard against the temptations of the flesh, but in selecting a career he might more safely engage in one connected with personal adornment than with those of war, appropriate enough to a person born under Mars. It was deemed especially essential that a physician should be familiar with the elements of astrology in order that he might by observing the conjunctions of the planets determine the critical days in the course of particular diseases and adjust his treatment accordingly. The most celebrated of medieval astrologers, Cecco d' Ascoli, who held the chair of astrology in the university of Bologna, maintained that a physician without astrology was no better than an eye which did not see. Rashdall records an instance in the sixteenth century of a scholar admitted by the University of Oxford to practice in astrology, and assumes that it was the regular custom to grant such licenses. The University of Pressburg (*q.v.*), founded in 1465–1467, owed its special fame to its astrological professors. By the end of the sixteenth century astrology began to lose its hold on the learned, but the gifted astronomer, Kepler (*q.v.*), who died in 1630, still adhered to the ancient belief. It has often been alleged that astrology served to foster astronomy. This may have been true in the beginning, but astronomy had become an independent science in the times of Eratosthenes and Hipparchus, whose discoveries are brought together in Ptolemy's *Almagest*, which became the manual of the Arabic and medieval astronomers. In the *Sphere* of John of Holywood (d. 1252) (*q.v.*), in the *Opus Majus* of Roger Bacon and elsewhere, astronomical facts are carefully separated from the study of astrology. We may conclude, therefore, that the development of astronomy owed little or nothing to the bastard science of astrology.

J. H. R.

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ASTRONOMY. — Astronomy is the oldest of the sciences: doubtless the very first phenomena of nature ever made the subject of human inquiry were astronomical phenomena. It is probably not too much to say that a study of the state of culture among the most ancient peoples involves principally an investigation of their astronomic acquirements. There must have been a time in the dim past when every man engaged in the teaching profession was instructing every one of his students about astronomy; — to-day, only an infinitesimal fraction of our teachers teach this science, and that only to a small number of students.

The change must have been gradual, and the reason for it is not far to seek. It did not become operative with universal effect until comparatively recent times: astronomy ceased to be taught universally and extensively about the date when science began to be primarily utilitarian in motive. At this time also the general facts and theories of astronomy had been known so long that it seemed as though they had always been known to every one; as though children were now born with astronomic knowledge, or would at least acquire it themselves as they learn to creep and walk. To a utilitarian age astronomy seems a somewhat worn-out, useless science: it has been relegated to a few pages in schoolbooks on geography, pages that are doubtless often omitted when the book is studied. It is probably a real fact, and an interesting one, that the entire educated public was once so well versed in astronomy that the science was ousted from the curricula of professional teachers. Children learned it from their parents, no doubt, as girls learn cooking and other domestic accomplishments from their mothers.

But the lapse of generations has seen this kind of knowledge pass into the region of the forgotten. Probably Sir George Airy was right in the remark attributed to him, that not more than one man in a thousand knows that the stars rise and set like the sun and moon. A learned professor (not of astronomy) once asked the writer whether the moon passes through the phases of full moon, new moon, etc., in all parts of the earth, as it did in the region where he lived.

Astronomy formed one of the subjects of study included under the *quadrivium* (*q.v.*), and was usually associated with mathematics. The tendency even beyond the period of the great astronomers was to pay more attention to the fanciful and astrological. This was fostered also by the influence of the Arabic and Hebrew writers which came through Spain. In the universities the subject of astronomy was in almost all cases taught by a professor of mathematics. Of the great astronomers Tycho Brahe lectured at the University of Copenhagen in 1574; Galileo Galilei was first professor of mathematics and astronomy at Pisa from 1589 to 1592, but did not meet with so much success as at Padua where he lectured to crowded classes for twelve years; Kepler was attracted to astronomy from theology by an opportunity which presented itself of an appointment as lecturer on mathematics and astronomy at Gratz, in 1594, but so little popularity did these subjects enjoy that he was compelled to fill up his time by giving instruction in other branches. The opposition of the Church and the radical views of the leaders in the field coöperated effectively to prevent any change in the content of astronomy, so that even as late as the beginnings of the seventeenth century Ptolemy's *Almagest* and *Theorica Planetarum* continued to be used as official textbooks. The establishment of the Savilian Professorship of Astronomy at Oxford in 1619 put an end to the old system. Frequently this office was combined with that of Royal Astronomer at the Greenwich Observatory. Newton's great contributions at Cambridge were made as Lucasian Professor of Mathematics. The chair in astronomy and experimental philosophy at Cambridge was not instituted until 1704; in 1749 another chair in astronomy and geometry was founded. At Glasgow University the chair in astronomy, together with an observatory, was established in 1760; at Dublin in 1774; and at Edinburgh in 1786. As a general rule astronomical studies are taken up by advanced students in mathematics and physics. At Glasgow the subject may be offered for both ordinary and honors degrees. The newer universities have not as yet instituted separate chairs in astronomy; the subject is associated usually with the department of physics.

In Germany at the beginning of the last century general courses were offered in the universities in astronomy as a cultural subject. At present the subject is usually associated with the professorships in mathematics. Few of the many universities have a separate department in astronomy; in several the subject is not represented by a professor. At Marburg astronomy is associated with physics. Many of the universities are furnished with observatories, which, however, through lack of means, are not so well equipped as the English and American.

In the United States the science formed a subject of the college curriculum from an early date. It is mentioned in *New England's First Fruits* (1643) as being studied at Harvard in the third year of the course. When the course at Harvard was lengthened to four years, astronomy was put into the fourth year; so the Harvard archives in a manuscript dated 1690 refer to the use of Gassendus' *Institutio Astronomica*, a textbook which had a long vogue and is mentioned again in the diary of President Wadsworth (1725–1736) as being used by the Senior Sophisters. By 1742 the textbook appears to be Watts' *Astronomy*, which is also mentioned in a letter of Joseph Shippen, who was a student at Princeton (1750). In 1760 it is voted at Harvard " that the thanks of this corporation be given to the Hon. James Bowdoin for his generous donation of an orrery to the apparatus of Harvard College "; and an expedition was sent to Newfoundland to observe the transit of Venus. In 1788 it was voted that " Mr. Webber be desired to give the Senior Class after Commencement, such a course of astronomical lectures as those of that standing have been used to attend in the fall of the year for several years past." And in the same year it was voted that " the Hollis Professor of Mathematics, shall carry the four classes forward by private lectures in the Mathematics in the following order . . . in conic sections as far as shall be necessary for the understanding of those parts of Natural Philosophy and Astronomy where these sections are applied; in spheric Geometry and Trigonometry, with the application of the solution of Astronomical Problems, etc. . . . That it be recommended to the Professor, in his public lectures, which he shall deliver once a week, viz., on Wednesdays at two o'clock in the afternoon, as has been customary, to be as systematic as may be, and to endeavor to go through a regular course on the Theory of Natural Philosophy and Astronomy in four years. But this systematic pursuit shall not prevent the Professor's interesting lectures upon any important phenomena that may turn up, though they may, for a short term, interrupt the general course. . . . He shall, under Solar Astronomy, particularly explain the Precession of the Equinoxes, the nutation of the Earth's Axis, and the motion of the Apogee, — Under Lunar Astronomy, the Moon's Libration, and the motion of her Apogee and Nodes; and under sydereal Astronomy, the Aberration of Light." In 1791 astronomy was included among the subjects of examination, and in 1796 Ferguson's *Astronomy* is mentioned. The subject was taught by the professor or tutor in mathematics and natural philosophy, and the mathematical astronomy was emphasized. The only apparatus used was an orrery.

The course at Harvard is typical of the other universities at that time. At Yale " natural philosophy, astronomy, and other parts of mathematics " were taught in the third year in the days of Rector Williams. In 1771 a professorship of mathematics and natural philosophy was established, and it is stated by his son that Dr. Dwight carried his mathematical class " as far as any of them could go in *Principia* of Newton." In addition to Gassendus' *Astronomy* the textbooks of Nehemiah Strong (*Astronomy Improved*) and of Benjamin Martin (*Philosophia Britannica, a New and Comprehensive System of the Newtonian Philosophy, Astronomy, Geography with notes*). In the advertisement of King's College (now Columbia University) it is mentioned that " it is the design of the College to instruct and perfect youth in . . . the knowledge of all nature in the Heavens above us and in the Air. . . . " (1754.) And in 1755 the Laws and Orders include mathematics and mathematical and experimental philosophy. In 1784 there was appointed a Professor of Natural Philosophy and Astronomy, who in 1789 lectured once a day on astronomy. At Princeton astronomy was evidently taught in 1750 with the aid of textbooks (Martin's and Watt's) and an orrery constructed by David Rittenhouse, who himself had one of the earliest private observatories in America.

Astronomy continued to be the adjunct of the professor of mathematics or natural philosophy or both until the last century. A professor of astronomy appears to have been appointed at Harvard in 1825. Observatory work was a matter of slow development. Lack of funds and opposition from those who did not understand the needs of such an institution or suspected its uses prevented any progress in the eighteenth century. An attempt was made at Harvard in 1816 through John Farrar, Hollis Professor of Mathematics and Natural Philosophy, and Nathaniel Bowditch to establish an observatory, but no more advance was made than to secure sketches for it. In 1823 John Quincy Adams interested himself in the matter, and made an offer of financial help, if subscriptions could be raised. But this attempt also failed. In 1839 William Cranch Bond was appointed astronomical observer. Bond brought his apparatus to Cambridge and was temporarily located there. In 1843 interest was aroused in astronomy by a remarkable comet; the occasion was seized by Professor Benjamin Peirce to raise subscriptions for an observatory, which was finally erected and opened in 1847. In 1832 Yale had erected a telescope on the tower of one of her buildings. In 1837 Professor Albert Hopkins had completed an observatory at Williams College, the first in this country of a permanent kind. Hopkins was one of the earliest teachers of astronomy to use the observatory in connection with his lectures. In 1838 an observatory was established at the Central High School in Philadelphia. At Princeton the first observatory, the Halsted Observatory, was not established until 1872, followed in 1878 by an observatory of instruction.

But the observatories which were erected at the colleges were mainly, with few exceptions, for the use of practical astronomers. Thus that at Harvard became the seat of the American Nautical Almanac. It was only gradually that the importance of laboratory work in astronomy became established as a principle of instruction, and observatory work, which for a long time was given merely as a favor of the practical astronomer, was recognized as an essential training.

Astronomy is taught to-day to a similar extent in all civilized countries; as follows: (1) brief attention in elementary geography classes; (2) classes in a few high schools and similar institutions; (3) elementary or introductory courses in colleges; (4) advanced or graduate courses in universities.

A few words may be said about these various sources of astronomic instruction. In the first place, it is probably hopeless to expect much from elementary school work, because any effort to give more attention to school astronomy would surely be branded as a non-utilitarian fad. Moreover, it is questionable whether such an effort would be justifiable; for, after all, astronomy as a study has its best disciplinary effect upon somewhat maturer minds. It should be found rather in the latter part of the high school course, or in the college.

College and high school courses in elementary astronomy consist of the so-called descriptive astronomy. It is in this part of the general educational curriculum that astronomy as a study has its proper place, not merely to relieve ignorance by conveying to the student a few facts about the heavenly bodies; but because this science has so particularly high a value in training the mind. There is no other branch of human knowledge possessing a subject matter so well adapted to produce the habit of accurate thinking. Astronomy owes its real preëminence in this respect to the intricacy of the problems it presents, to the extraordinary precision of which their solutions admit, and to the appeal it makes to the imagination by reason of the vast volumes and areas included within the scope of its problems. Events occur within a drop of water as intricate as any in the solar system; they occur doubtless even within a single atom, mere element in a constituent molecule of that water; but for educational purposes the study of those atomic intricacies is surely incomparably inferior to the vaster gyrations of our sun and planets.

But notwithstanding the above facts, which are sufficiently obvious, the science of astronomy is taught to-day to an insignificant fraction only of the student army attending our colleges. Everywhere it is an elective subject, and it is not elected by many students. This undesirable state would doubtless soon cease to exist if teachers would avoid two errors into which they have shown a surprising tendency to fall. The first is an effort to devote altogether too much time and attention to the very latest discoveries; the second is an undue use of the stereopticon in the hope of making the subject more interesting. The proper way to plan an elementary course in astronomy is to imagine the students looking about them at the heavens above and the earth beneath, and to give them simple but complete explanations of the phenomena that unfold themselves there before their eyes. These explanations should be made by the teacher verbally with the assistance of blackboard diagrams and home textbook reading by the student. The magic lantern should be used sparingly and occasionally to illustrate by photographs the appearance of the heavenly bodies as shown by great telescopes. Frequently the professor should meet the class personally at the observatory in small sections to emphasize the regular classroom work by informal explanations and questionings. A large quantity of observational work is not as important as the sectional meetings just mentioned. But the observatory meetings should be held regularly, irrespective of weather, because the explanatory questioning should be considered the essential thing, and not "nature-study" through the telescope.

Having thus discussed briefly the subject of elementary astronomy, it remains to touch upon advanced or graduate courses in this science. These are everywhere attended by very few students. Probably most candidates for the advanced university degree of Ph.D. intend to be teachers, and they naturally desire to study subjects of which the elements are widely taught, and in which there is therefore a good opportunity to secure a position. All high schools and colleges have professors of mathematics and physics; only the large institutions maintain separate professorships of astronomy. Therefore graduate students who have an inclination for exact science take their advanced work in mathematics and physics; not infrequently they find advisable a third course in the history or theory of education. The ancient and most honorable subject of celestial mechanics, always extolled as the branch of learning in which have been achieved the highest triumphs of the human intellect, is now neglected almost totally by graduate students. It does not appear that blame attaches to any one for this state of affairs, as is the case in the neglect of elementary instruction. The trend of events has brought this result irresistibly, as it has many other results unforeseen a generation or two in the past.

In addition to the very advanced courses, leading to the Ph.D. degree, most universities in Europe and America offer also certain intermediate courses, which are attended each year by a very few students in the large institutions. One of these courses is always practical. Students are instructed in the use of the sextant, transit, and other astronomical instruments; they make their own observations and carry out the necessary calculations under direction. The other somewhat advanced course usually deals with comet orbit calculations; it is more or less introductory to celestial mechanics, and seldom has more than two or three students. Finally, one or two universities offer practical courses in astrophysics, the work being done in the observatories, and requiring extremely elaborate and costly instrumental equipment.

On the whole, we may sum up the present educational outlook in astronomy quite optimistically. Overinsistence upon laboratory work will cease, and will be replaced by study in science as a part of modern culture. When that occurs, astronomy will come into its own again, so far as elementary instruction is concerned. This will benefit both the teacher and the student; both will be better men because of it. The immediate future of advanced instruction cannot be foreseen; it will depend on the impetus and direction given to human thought by those few men of genius who shall live during the next generation. H. J.

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ASYMBOLIA, or ASYMBOLY. — The loss of the ability to understand signs of speech, and to communicate one's ideas by words or gestures. Sometimes used as a synonym of aphasia (*q.v.*).

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ATAVISM. — The characteristics of an individual are very frequently due to inheritance which must be traced back of the immediate parents to an earlier ancestor. This reversion to an earlier generation is known as atavism. A complicated law of inheritance was worked out by Mendel. In accordance with this law every second generation resembles the grandparents in a certain definite ratio. The intermediate generations, that is, the parents of the individual under consideration, may exhibit a combination of the characteristics which appear in pure form in the last generation and in the grandparent. One interesting case of atavism appears in the fact that color-blindness is likely to be transmitted through a female who does not herself exhibit the characteristic. A boy may thus resemble his grandfather in being color-blind, though the mother does not exhibit the trait. The extent to which atavism appears in human beings has been a subject of inquiry. The results of such investigations have, however, never furnished any large grounds for educational conclusions.

C. H. J.

ATAXIA. — A deficiency or an absence of the ability to coördinate movements. The term is applied to defects of movement of the body as a whole or to those of any of its parts, and at times is used as the name of the disease that produces the condition.

When a movement is to be performed, efferent nervous impulses are sent from the cells in the anterior horn of the spinal cord (which cells may have been activated by impulses from higher cells, *e.g.* those in the cerebral cortex), and there result contraction of certain muscles and relaxation of others. Accompanying the movement there is a stimulation of the afferent end organs in the moving tissues. The afferent nervous impulses that are originated by the movement go to the spinal cord and thence at times to the cerebellum and to the cerebrum. These impulses arise from the end organs in the skin, the joints, the tendons, the muscles, and, possibly, the bones.

Somehow as the result of the sequence of efferent and afferent impulses a nervous association is formed which in subsequent movements exerts an influence on the efferent impulse. In other words, a control is established, and it is found that movements which at first are of a gross and to some extent of an indiscriminate character become finer, more settled, and more accurately adjusted to the desired end. To characterize the later stages of muscular education and control the term "coördination" is used, while the movements in which the control is lacking or defective are called incoördinate or ataxic.

Since it is necessary that there be an education in movement, and since it is known that the accuracy of movement depends upon certain sensory factors (at times of the nature of representation), it follows that there may be all grades of coördination or incoördination depending upon the sensory capabilities and upon the amount of the education. It also is easily understood that incoördination or ataxia is natural when a movement has been performed only a few times and when the sensory elements are impaired.

To most readers it is unnecessary to point out the ataxic condition in young children, which at birth is almost complete, and which persists for many of the most important human activities even for three or four years. In this connection two kinds of coördinated movements need but be mentioned: walking and vocal speech. In other activities a normal incoördination or ataxia may be noted even in adults. The reader need but call to mind or observe the awkward and useless motions of most men when they sew; the badly directed, peculiar movements of a woman when she throws a ball; the clumsy, unskillful activity of the adult learning to dance; and the laborious movements of one learning to swim. If the education process begins too late in life, certain movements may never become so well coördinated that the activity is easily and well performed.

The ability to coördinate movements appears to have a direct relation with the ability of the lower centers (*i.e.* those below the cerebral cortex) to assume control of these movements, but the condition of ataxia may be the result of injury, disease, or destruction of any part of the afferent system that is used in coördination. It is known that lesions or functional alterations of the peripheral nerves, of the spinal cord and medulla oblongata, of the cerebellum and of the cerebrum may produce ataxia, provided the appropriate afferent elements are involved.

A common ataxic experience, due to a functional derangement, is that experienced in the leg when that member "goes to sleep." The condition persists for only a short time, but, with the exception of cramp or of paræsthesia (peculiar subjective sensations of tingling and heaviness), is characteristic of most ataxic states. If cramp is not present, all kinds of movement are possible; the individual may stand or walk or even dance, but these movements are awkward, and both objectively and subjectively apparently uncontrolled. The leg may be dragged, the foot may be lifted too high or put down too forcibly. In such a condition the spinal cord or the brain or both do not receive the proper afferent impulses, and the individual or his brain or his spinal cord does not become aware of the position of the limb.

Alcoholic liquors produce an ataxia when taken in sufficient quantities. There is a staggering gait, a stumbling and hesitating speech, fumbling of the hands, and a difficulty in the performance of all movements requiring fine adjustment. In such a condition sensory deficiencies can be demonstrated, and, when the amount of the ingested alcohol is very large, a complete anæsthesia may result.

The sway of the body, the stagger, the slow, hesitating, slurring, and jumbled speech of the drunkard are paralleled by similar states due to organic nervous disease not traceable to alcohol. These symptoms are found in locomotor ataxia (*tabes dorsalis*). In this disease there is a degeneration or destruction of the posterior nerve roots and columns of the spinal cord, and the afferent impulses that normally traverse these paths cannot reach their respective centers. A similar combination occurs in the diseases known as "combined sclerosis" and "Friedreich's ataxia," although in both diseases there may be involved the efferent paths as well as the afferent. Some cases have been observed in which ataxia is due to defective development of the cerebellum, and disease of this organ in adults produces a similar condition, usually noticeable only when the individual is in the upright position. It may also be mentioned that inflammation of and hemorrhage into the internal ear produce a staggering gait, associated with vertigo. All the symptoms in these organic diseases may be simulated in neurasthenia (*q.v.*) and hysteria (*q.v.*). Locomotor ataxia and combined sclerosis are almost exclusively diseases of adult life, while Friedreich's ataxia and the ataxia of Marie (due to defective development of the cerebellum) are congenital. The ataxias due to internal and middle ear diseases and those associated with neurasthenia and hysteria may arise at any age.

Most, but not all, of the ataxias are chronic and incurable. Those associated with neurasthenia and hysteria give way to normal coördination under appropriate treatment for these diseases, while the ataxias of organic origin may be ameliorated by appropriate measures, largely of an educational character. In many of the organic ataxias associations other than those between the normal afferent (*i.e.* from skin, muscles, joints, tendons, and bones) and efferent impulses may be formed, and the individual obtain or regain a degree of coördination satisfactory for the most important purposes of life. For the treatment of locomotor ataxia Fraenkel has devised a system of training which has produced apparently wonderful results. The system depends upon the principle of the substitution of other afferent impulses for those normally employed in the coördination of movement. The most important substitution is that of visual and motor impulses from the eyes for the normal afferent impulses from the legs. In other cases in which ataxia is not associated with paralysis or other motor defect such a course of training is efficacious.

A few words may be added about the popular misconception of an exclusive connection between paralysis and the ability to perform actions. In locomotor ataxia, in cerebellar ataxia, and in the early stages of Friedreich's ataxia no true paralysis is present, but there is an apparent inability to move the limbs properly. This inability, as has been explained above, is entirely due to the lack of association between the afferent and efferent elements. An example from school life may help to make this fact remembered. A teacher of a lower grade called the writer's attention to a boy in her class, whose apparent inability to stand in line, to perform simple gymnastic movements when he was shown them, etc., had caused her to be censured by one of the supervisors. The supervisor would not believe the boy was abnormal in this direction, for there was no paralysis and no defect of vision or of hearing. A brief examination, suggested by the teacher's report, showed that the boy had a defective position sense, that with his eyes closed he could not touch his nose, did not know the position in which his legs were placed, and was ataxic from absence or defect of the normal afferent movement impulses. Such a boy can be trained to walk, to stand, and to perform all other important coördinate actions, but only when there is on the part of the teacher and the parents an appreciation of the reason for the defect, ánd when appropriate, not the usual, methods are employed. S. I. F.

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ATELIER. — See Art Schools; Architectural Education.

ATHANASIUS, ST. — Born in Alexandria in 297. Nothing is known of his early life; but about 313, when he was 16 years of age, Alexander, his predecessor in the bishopric of Alexandria, made him his pupil and private secretary. Thereafter he devoted himself to the Christian ministry. His education was probably gained in his native city, at the museum, where he would have learned grammar, logic, and rhetoric. In the Christian catechetical school he would have been carefully trained in the philosophy of Christianity. However, these details may be uncertain; but it is clear, from his own writings, that his mind was well disciplined, and that he possessed a character chastened by asceticism, while his intimacy with the famous recluse, Anthony, served to develop in him faith and courage of a high order. His intellectual career is intimately associated with the controversies of his age, chiefly the movement which centered about the crystallization of the Catholic dogma of the Trinity, in which he maintained the ultradogmatic views enunciated at the Council of Nicea (325). He may also be said to have laid the foundation of that movement which later resulted in the hardening of tradition under the Augustinian influence, which practically dominated the intellectual life of the Church during the medieval period, and exerted such a profound influence on the education of that and succeeding times. The history of these controversies properly belongs to historical theology, and need not detain us here. His friend, Gregory of Nazianzus, describes this famous controversialist as small of stature, but his face was " as the face of an angel." Though engaged in the bitterest contests, resisting false charges, suffering in banishment, he seems to have been a kindly man, pleasant in conversation and in temper, effective both in argument and in action. As a teacher he was directed by the desire to be of service to all classes of minds, to which he seems to have adapted himself with success. His long and somewhat unprofitable career came to a close in 373. His works include the two essays, *Contra Gentes*, *De Incarnatione Verbi*, the so-called *Festal Letters*, and his *Apologia*, in none of which is a consistent pedagogical doctrine revealed. His significance for general education, therefore, is small, and lies chiefly, as already stated, in his defense of the orthodox doctrine of the Trinity and its relation to the nature and extent of human knowledge. It seems certain that the views of Athanasius indicate a departure from those held by the early Church.

The works of Athanasius are included in the *Library of Church Fathers* (Oxford, 1843).

Möhler's *Athanasius* (1827), Farrar, *Lives of the Fathers*, Vol. I, pp. 369–425 (New York, 1889). See also the works of Dorner and Schleiermacher. H. D.

ATHELHARD. — See Adelhard.

ATHENAGORAS. — Christian philosopher born at Athens in the second century A.D., exactly when it is not known. Nothing reliable is known of his early life and training, except that he was a Christian and wrote his chief work, the *Apology*, which was addressed to the Emperor Marcus Aurelius, about 176 or 177 A.D. He was a powerful thinker and great teacher, and there is some evidence that he was, at least for a time, the head of the famous catechetical school at Alexandria, and probably the teacher of Clement (*q.v.*), its illustrious leader (150–220). As such he naturally claims some attention in the history of educational theory and practice. His philosophical doctrine is profoundly tinged with Platonism and does not show complete independence; yet he is one of the most attractive writers of the period of the Apologists, and did much, in his office as a teacher, to orient the western mind in the spirit of the idealistic faith by showing the various points of contact between Platonism and Christianity. Essentially an eclectic and reconciler, like others of this school, he maintained the free union of faith and knowledge, resisting the ultra-dogmatic view, and attracted many pupils by the agreeable combination of the Hellenistic and Christian views and by the beauty of his presentation. Quite naturally, however, the theological interest overtops all the others. Hence his importance for technical educational theory and practice is small. Perhaps his doctrine of knowledge bears the closest relation to pedagogy, and deserves attention for its irenic tendency. He maintained that the *Logos*, or divine intelligence, was, equally for the Hellenic poets and philosophers as for the inspired writers of the Scriptures, the source of the perfect clearness and certainty of knowledge; that divine truth was the result, not of the excogitations of the mind, but of revelation, vouchsafed to the thinker by the Holy Spirit speaking through the *Logos*. In general, rationality is the active force (*ἰδέα καὶ ἐνέργεια*) in all created things and minds, and emanates from God, going forth from him and returning to him like a ray of the sun. His pedagogical doctrine, though not defined in so many words, may thus be summarized under these two heads: (1) knowledge and faith are indissolubly connected in the process of education; (2) the substance of teaching is the truth revealed by the divine spirit to the soul, and is a gradual revelation, culminating in Christianity. H. D.

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The works of Athenagoras have been collected and translated in the *Ante-Nicene Library*.

Clarisse, Th. A. *De Ath. Vita, Scriptis et Doctrina.* (Leyden, 1819.)

ATHENS COLLEGE, ATHENS, ALA. — An institution for the education of young women founded by the Tennessee Conference in 1842 and transferred to the North Alabama Conference in 1870. Students are admitted at the age of 15, and for the degree courses the requirements are approximately 8 points of high school work. Classical, scientific, and normal certificate courses are offered. Preparatory, fine arts, and commercial departments are maintained. There is a faculty of 16 professors and instructors. Mary Norman Moore is the president.

ATHENS, THE UNIVERSITY OF. — The University of Athens was due to the organization and establishment under governmental control, in the second century A.D., of instruction in two different branches of study — philosophy and rhetoric. Both of these had been given an academic standing in the fifth century B.C., or soon after, as a result of the impulse given to study by Socrates and the Sophists. Philosophy found a home in the four great schools of philosophy, the Academic, the Peripatetic, the Stoic, and the Epicurean, while rhetoric, or oratory, was developed into an art, and made one of the studies of the Grecian youth, by Isocrates in the fourth century B.C. Into this higher education of the fourth and third centuries B.C. there became dovetailed the ephebic college. This was a sort of military academy, in which originally all native male Athenians, on coming of age, were obliged to enroll themselves for a period of two years. Later, that is, from the end of the second century B.C., foreigners were also admitted. Gradually it became the custom for the members of the school to attend, in a body and under the leadership of their director, the lectures of the philosophers, rhetoricians, and "grammarians." Still later the intellectual studies took precedence of the military training, and in the end the latter became wholly secondary to the former or was allowed to lapse altogether. For the period of the University proper, that is, from the second century A.D. onward, the ephebic college has no significance in the history of the higher education.

From the fourth century B.C. to the second century A.D. philosophical and rhetorical schools flourished side by side at Athens as private institutions, and students flocked to them from many parts of the Greek and Roman worlds. From time to time during the latter part of this period certain privileges were granted to teachers, individually or as a class, but no attempt was made to give them an official standing until the time of Antoninus Pius. Antoninus is said to have granted honors and salaries to rhetoricians and philosophers throughout the provinces. The honors consisted for the most part of exemption from taxes and immunity from public duties, many of which duties required the expenditure of much time and money. These honors were to be granted only after formal vote of the local council and enrollment of the beneficiary in the official list of beneficiaries. The chair of rhetoric established at Athens by Antoninus was called the "political" chair, but whether by this was meant a municipal chair, *i.e.* a chair endowed by the municipality, or a chair of political, as distinguished from sophistical, oratory, is not certain. The salary of this chair was one talent ($1080). Possibly a chair of "grammar" and a chair or chairs of philosophy also were endowed at Athens by this emperor.

The work begun by Antoninus Pius was continued by Marcus Aurelius (*q.v.*). Marcus established at Athens a second chair of rhetoric, called the "sophistical" chair, as well as two chairs in each of the four schools of philosophy. The salary of each of these chairs was 10,000 drachmæ ($1800), which was to be paid from the imperial funds. Marcus assigned to the venerable sophist, Herodes Atticus, the duty of making the appointments, after examination, to the philosophical chairs, while he reserved to himself the privilege of filling the chair of sophistry. This arrangement, so far as concerns the sophistical chair, continued up to the middle of the third century. With the philosophical chairs the case was otherwise. Herodes died about 179. After his death the duty of examining the candidates and making the appointments in this department was assigned to a "board of electors," the constitution of which is not certain; they are called by Lucian "the best, the oldest, and the wisest of those in the city," and it has been thought that they were members of the local council or the Areopagus. The holder of the sophistical chair ranked in dignity above the other professors.

It is evident that Marcus aimed to make of Athens a real university center. The measures he took in furtherance of this aim were thoroughgoing and extensive. Loss of independence on the part of the schools, and greater oversight and control of the schools on the part of the emperor marked the changes that he introduced. The rhetorical, or sophistical, instruction thus officially established at Athens and elsewhere by Antoninus Pius and Marcus Aurelius claimed to prepare young men for professional and official life (a claim that the philosophical schools also had originally made). The training that was provided was literary and humanistic. The "grammarian" (a term of much broader import than the term as used in English) introduced the pupil to the language, literature, and life of the Greek race; the sophist, whose course followed that of the "grammarian," trained him to individual effort in the use of language and argument.

Through the second century and until about the middle of the third century the University of Athens prospered uninterruptedly. Some of the distinguished men who taught there during this period were Herodes Atticus, Theodotus, Lollianus, Philiscus, and Adrian. Early in the second half of the third century, owing to the inroads of the Gothic tribes from the north, the whole mechanism of the University fell into disarrangement. With the advent of new conditions, however, under Diocletian and Constantine, the University entered, in somewhat altered form, upon another period of prosperity. The various schools of philosophy, with the exception of the Academic school, had by this time passed out of existence, but sophistry flourished no less gloriously than before. Distinguished sophists at Athens in the fourth century were Proæresius, Julian, Himerius, and Hephæstion.

The number of official sophists at Athens in the fourth century is uncertain, but there were at least three, and there may have been more. Besides the regularly appointed teachers, there were many others of various grades who held no official appointment, and who depended for their income solely on the fees of their students. The local council was at this time the appointing power, subject, however, to the direction, which was not always or perhaps even generally exercised, of the proconsul and the emperor. Candidates must be of good moral character and proficiency in the subject of their profession. Sometimes, notably on occasion of the appointment of the Head of the rhetorical school, a rhetorical contest was instituted among the various candidates, for the purpose of determining which candidate could assert the best claim to the position.

The establishment by Constantine of Christianity as the court religion contained the germs of serious consequences for Athens, and it was this that contributed in largest measure to the fall of the University. The ancient culture and the ancient religion were so closely united that the two were generally considered inseparable, and the fall of the one meant the ultimate fall of the other. The fifth century is marked by the gradual decline of the study of oratory and the growth of the Neo-Platonic school at Athens. Neo-Platonism at this time represented nearly all the philosophy of the age. It pretended to be simply a development of the ideas contained in the writings of Plato, but it really embodied doctrines of other schools, as the Aristotelian and the Stoic, and finally assumed the character of a religion tinged with Eastern mysticism. The Neo-Platonic school at Athens enjoyed the endowment of the Academy, of which it claimed to be the legitimate successor. To it flocked the most of those who were philosophically or spiritually inclined, but were out of sympathy with the new religion. The deathblow to the ancient instruction came in a rescript of Justinian of the year 529, forbidding the teaching of all philosophy and the expounding of the law at Athens. All grants of public funds made by previous emperors in the interests of learning were withdrawn, and the endowment of the philosophical school at Athens was confiscated.

The University of Athens, in common with most other Greek universities, was of the nature of a voluntary congregation of professors and students, without governing or examining board. The various streams of education met either in the local council or in the emperor, but no attempt was made by either of these to regulate the kind or the amount of instruction. Athens was the chief center of sophistical study in ancient times. The history and associations of the city exercised a powerful influence over the imaginations of men throughout antiquity, and students flocked thither from all parts of the Eastern world. Many of the distinctive features of Greek university life existed there in their most pronounced form.

J. W. H. W.

See Greece, Education in; Universities.

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ATHLETICS, EDUCATIONAL. — Forms of physical exercises including individual and team games, track and field athletics and all contests of physical strength and skill for personal pleasure or individual or social honors, which are carried on in connection with educational work, and at least ostensibly for educational ends. All youth in all tribes and all nations naturally enter into physical contests of some character, especially running, leaping, wrestling, throwing, etc. These contests develop in widely different forms, and are transmitted by tradition, thus entering into the customs of the people. Social thinkers recognize certain educational values in these contests and encourage them. Historically this tendency developed to its greatest perfection among the Ancient Greeks. In England athletics, like gymnastics in Germany and Sweden, are a well-recognized phase of the general education of youth. The movement in the United States, educationally and socially, is of national importance.

During the last decade of the nineteenth century and the first decade of the twentieth, a nation-wide development and organization of athletics among youth took place. Every institution centered in the life of youth, either by compulsion or choice assumed some degree of leadership in athletics. The older movement in athletic clubs and especially in colleges became more intensive with growing faculty control in the latter. The Young Men's Christian Associations put greater emphasis on physical work and organized the Athletic League of North America. Development in high schools became practically universal, extended to elementary schools, and gained an added power through the organization of public school athletic leagues. The playground campaign, with its athletics for the "older children," became a national issue. Finally, social settlements, Sunday schools, and boys' clubs began the organization of athletic activities, and particularly in large cities the formation of athletic leagues. This general development came partly from the natural inclinations of youth and partly from the deliberate planning of adults interested in the educational and social welfare of youth.

While the values of athletic activities among youth may be recognized, certain difficulties in securing these values for large numbers, and certain tendencies to evil, are also recognized by educators. Furthermore, there is a tendency for athletics to be totally transformed in character, as they develop under certain social conditions best illustrated historically in the degeneration of the contests of Ancient Greece into those of a later period, and finally into those of the Roman Circus and Amphitheater.

Educational Value of Athletics. — The educational values of athletics are primarily those of all vigorous neuromuscular exercise. (1) Exercise secures organic development, *i.e.* the development of those organs and functions during the growth of the individual from infancy to maturity that gives vitality, vigor, functional power for health to the limit of inherited possibilities. (2) Exercise secures psychomotor development, *i.e.* the development of that control of the muscular system which gives skill, body resourcefulness, and the fundamental basis for a broad "manual," industrial, and artistic training. (3) Exercise gives the opportunity for securing a mental and moral discipline (*a*) by giving a drill in vigorous activities which require alertness, effort, determination; (*b*) by giving self-knowledge of physical powers through comparison with others; (*c*) by giving standards for intelligent care of the body, especially the nervous system, to secure the greatest physical efficiency; (*d*) by giving discipline in self-control; (*e*) by giving concepts of "team work" or coöperative self-subordination and social experience under conditions that identify the youth with the social interests of the group demanding coöperation.

These values may be secured with different emphasis through industrial labor, gymnastics, vigorous play, or athletics. The aim in each of these activities is different, hence the bodily results vary. In industrial activities, the aim is industrial results; the bodily results may be and usually are very unbalanced. In gymnastics (*q.v.*), the aim is physical development through set, formal movements, definitely arranged and susceptible of predetermination as to results. In athletics (though they may also be taken consciously for the exercise), the aim is the contest, and the movements depend upon the exigencies of the contest. The exercise is not so easily predetermined as to results. This gives gymnastics the advantage in the precision of physical results that may be secured. In athletics the movements are more specialized and less easily controlled, though they may be graded loosely to fit individual needs and tastes. While athletics, generally speaking, secure all results, gymnastics in some cases will succeed where athletics will fail. The advantages of athletics over gymnastics arise from their competitive and social nature. While athletics may be used as a gymnastics, and some forms of gymnastics may be used in the spirit of athletics, and each made to grade one into the other, athletics are fundamentally competitive and social; gymnastics are only so by consent. Athletics, being competitive and social, rouse a broader range of social impulses and emotions than gymnastics. They furnish possibilities for a deeper social stimulus and training. Gymnastics gain all fundamental results, but cannot compare with athletics in these broader disciplinary values. From the viewpoint of general education and a broad physical education, athletics must be considered coördinate with gymnastics in composing the technique of physical education for youth. Athletics probably possess the larger values, but no broad rational system of physical education can be based on either alone.

Athletics, being contests between two or more individuals, are essentially social, and require organization through mutual agreement. Several possible groupings of individuals for contests may take place in any social community. (1) Two or more individuals or groups of individuals may organize spontaneously, day by day, irrespective of social affiliations, for a contest or a period of play. This is the usual method among town boys, town men, schoolboys, and many college men untouched by an athletic association. (2) Permanent associations may be organized to furnish facilities for contests among members, as is usually the case in local clubs such as tennis and golf associations. (3) Institutional groups or associations organized for other functions than athletics may organize for the development of facilities and the promotion of interest, as is usually the case in schools and clubs. (4) Finally' the members of the whole complex group, the institution, town, city, or nation, may organize under the name of the group for intergroup, interinstitutional, or international contests with other groups. The conditions affecting the development of athletics in these various groups differ. Many of the tendencies to evil grow with progress from the simpler to the more complex forms of organization. Under simple conditions the managerial function is undifferentiated. With the development of athletics in formal organization the managerial function arises as a distinct special force.

Athletics, like all games, are passed on by tradition — by imitation and by the older and experienced teaching the younger and inexperienced. As athletics progress in formal organization, the instructional function tends to be differentiated and specialized, and the instructor or coach develops with special powers for good or evil.

Creative Forces in Athletics. — All the various forms of athletics are created, and all the different tendencies in development are determined by two different classes of interests in contests common to all men: the participant's or contestant's impulses, pleasures, and interests in the activities and result of the contest, and the spectator's impulses, pleasures and interests in the contest and its results as a spectacle.

The Contestant's Incentives. — The contestant's pleasures and interests develop out of a series of play tendencies which must be understood to understand athletics. At the foundation of all vigorous muscular play there is a pleasure in the mere motor discharge exhibited by the young of all animals — a satisfaction of the primitive hunger for activity. To these fundamental pleasures there are added a long series of pleasurable emotional states. There is the conflict of daring and fear in feats, the pleasure in accomplishment and success, the pleasure and pride in overcoming difficulties and encountering risk or danger with all its emotional tension, the exaltation that comes in the rebound from fear through relief, the tension of expectation and shock of surprise, the pleasure of enduring hardships and suppressing pain, the pleasure in mastery of self, the inspiration of being a cause, and all the emotional content that holds attention and heightens the reality of life, which is opposed to ennui, and which for the adolescent is a neurological necessity. Then there are the impulses which influence the form of play. Through all childhood there is intense pleasure in being chased and chasing, hiding, being sought and seeking. The combative social and egoistic impulses, appearing in play from early childhood, become especially prominent with adolescence. Simple running for its own sake soon loses its charm and must be turned into a contest, thus satisfying the combative impulse. Rolling about on the floor is turned into a tussle. The egoistic impulse combines with the combative to give keenness to do something as well as or better than some one else. This tendency becomes peculiarly strong in the adolescent period (*q.v.*), the athletic age.

The social impulses, with perhaps some sexual elements, add their force. A desire for social applause and approbation leads often to self-exhibition and a display of skill or courage. Especially keen is the pleasure of achievement in competition under social conditions, perhaps the highest stimulus and satisfaction in youth to the egoistic impulses and emotions. Cravings for self-testings, self-evaluation, the determination of one's social status, become prominent. Where these impulses come in contact with developed or traditional play activities, as in athletics, there arises spontaneously a craving to gain one's place in the social system, to become a member of the team, to represent one's fellows, to support the honor of the group, and to win the satisfaction and applause of achievement, to gain honor. Public interest intensifies these expressions. To be prominent in social activities is one of the most stimulating of social motives.

Athletics are then the more formal contests among plays and games, limited by formal rules and arranged by social usage or agreement to give the largest satisfaction to the combative, egoistic, and social impulses and emotions.

The primary incentive in athletics is to secure these pleasures. Uninfluenced from without, there is no other conscious aim than these pleasures. With the development of athletics in social prominence, motives become more and more social, centering in honor. A series of secondary interests and motives arise, such as a desire for social prominence, leadership, or power. Under the stimulus of social applause and the desire for honor, the primary pleasures in the contest may be replaced by discomfort or hardship, or even pain, yet the motive sustains the effort. If to these highly developed motives the desire for material gain is added, the aim becomes professional. How the motives in the individual shall develop is determined by his temperament and the social conditions surrounding him. It is in the soil of specialized social motives, so far as the athlete is concerned, that most of the difficulties in athletics develop.

The nature of the incentives that create play and athletics, and the need of vigorous neuromuscular activities during the entire period of growth and development in order to realize bodily powers, reveal the functions and meaning of athletics. Nature made the play impulse the guardian of physical and mental needs. As contests appear with, and are especially characteristic of, the adolescent period, they may fairly be considered the natural vigorous exercise of youth. In this sense they may be interpreted as nature's means of physical education during the adolescent period. The primary motives in athletics and the normal results are purely educational: the youth's aim in contests is pleasure; nature's aim is education. In these activities, youth has inherent rights, and society is profoundly affected morally and socially by a neglect or protection of these rights. The place of athletics among the social customs of a people and in an educational system must be determined theoretically by the necessary amount of daily vigorous activity required during the successive years of youth to develop complete organic power and fundamental psychomotor skill, by the relative superiority of athletics to any other vigorous activity for moral and social discipline, and by the influence of these activities on the general recreative and social customs of the people.

The Spectator's Incentives. — The spectator's interest in athletics, like the participant's, arises from a deep-seated tendency in human nature. It is closely related to the dramatic interest. The struggles of others excite, fascinate, sway. Through sympathy the spectator enters into the struggle. Especially strong is the excitement in fighting contests. Human nature loves to see a fight. The extremes of emotion aroused are best illustrated by the world's great fighting spectacles: the gladiatorial contest, the chariot race, and the bull fight of earlier times; the horse race, the prize fight, and the professional baseball contest of modern times. The less extreme expressions are seen in the support of traveling acrobats, foot racers, and games not intended for spectators. Out of this primal interest in a struggle, common to all human beings, evolves the spectator.

The nature of the contest that will satisfy different individuals depends on character, intelligence, training, culture, and life conditions. On one side there are those who are satisfied with the pleasures of a skillful contest between gentlemen, on the other those who are satisfied only with a fierce personal, often brutal combat that reveals and rouses primitive human passions. Between these two extremes are all pleasure seekers at an athletic contest. In the development of all sports these two classes are ever in opposition. The desires of the one, therefore its influence, are in direct opposition to the other. Neither can be satisfied permanently with what pleases the other. The development of athletics in the group will be according to which element dominates in the creation of public sentiment. In proportion as the extreme spectacle-loving element can make its desires felt, will the anti-social tendencies, revealed in the destruction of many sports in the past, reappear. The human tendencies exhibited in the more or less extinct or disgraced contests of the past are still active, and reveal themselves in athletics to-day as in older times.

Many characters are not satisfied with the emotions connected with the spectacle alone. They must play with the emotions of chance and intensify the pleasures in the spectacle by a wager on the result, hence gambling becomes associated with the contest. Furthermore, many live over an emotional reverberation of the contest after it is finished, thus developing athletic gossip and the sporting sheet in newspapers, which in turn arouses the same tendencies in others.

The spectator everywhere tends to take sides and become a partisan. With the development of athletics, the organization of intergroup contests, and the selection of a team to represent the group, partisan athletics arise; the spectator becomes an institutional partisan and takes on a new power for influence. Social pride, clannishness, rivalry, and all the emotions exhibited by a group in competition with another group, surround the contest. Group becomes arrayed against group. The contest tends to take on the characteristics of group war. Public interest becomes partisan, and the partisan aim becomes the dominant aim. Interest centers in the emotions connected with the chances of winning, and shifts to an emphasis on results. Partisan demonstrations add to the spectacle, which attracts an ever-widening circle of spectators.

The influence of the spectator on the more complex development of athletics has been profound. The spectator's pleasure in the skilled exhibition or contest, and his willingness to pay for the pleasure, added to the economic needs of some skillful performers, have created the professional athlete and professional athletics. The professional makes a business of training and developing personal skill to supply a social demand for amusement. His activities can no longer be classified as play. Again the spectator, as indicated in the social elements of the contestant's incentives, supplies the more stimulating applause, approbation, and honors, and, as his interest centers on the more exciting contests and the most skilled athletes, he tends to mold the athlete's motives and the form of his activities. The athlete's motives and the spectator's interests tend to complement each other. This tendency is particularly conspicuous in intergroup partisan athletics. The susceptibilities of different individuals to the influences of the spectator vary greatly, but the combination of the specialized social motives in some athletes and the spectator's desires tend to the development of a form of specialized, highly skilled athletics primarily for the amusement of the spectator. The athlete requires special training, thus emphasizing the coaching function; the spectator's interests require management, thus emphasizing the managerial function. Therefore the influence of the spectator, while a stimulating, though unessential force in the development of athletics, tends toward a narrow, highly skilled form of athletics rather than toward a widening sway of the athletic interest as an educational force. Hence, the spectator and his influence are the most serious problem in the advancing power of athletics.

Evils of Athletics. — A number of evils are associated with athletic activities, but a distinction should be made between elemental tendencies to evil and the exaggerated complications of these evils through specific influences in the development of athletics.

1. There is the tendency, associated with all vigorous activities, to physical injury. This tendency is increased by an individual's competing in activities for which he is unfitted, inadequately trained, or improperly equipped, or against individuals out of his class, or while fatigued, etc. The tendency may be minimized by proper inspection, classification, and training.

2. There is the tendency, associated with many pleasurable activities, to overindulgence which results in physical harm and a dissipation of time. This is chiefly a product of ill-advised enthusiasm, and is exaggerated by the pressure of partisan rivalry. It is eliminated by competent supervision or leadership.

3. There is the tendency to specialization which may result in unbalanced development and unfortunate play habits. It is exaggerated artificially by the pressure of partisan rivalry in intergroup competition. It may be eliminated by competent supervision.

4. There is the tendency, common to all social competition, to bad manners, to irritability in defeat and gloating in victory, though individuals differ greatly in these tendencies. The tendency is exaggerated by bad play traditions in the group, by bad leadership, by disrespect for rivals, by bad treatment on the part of rivals, and by the pressure of partisans. It may be controlled by strong leadership in building wholesome play standards, and by good management, instruction, and discipline.

5. There is a tendency to evasions of the rules of the game. The rules are articles of agreement under which a trial of skill is to be made, violations of which are dishonest. The limitations of the rules offer temptations which test character and training. The tendency is exaggerated by bad play traditions, by vicious instructions from coaches, by suspicion of rivals, by partisan pressure to win, etc. The tendency may be controlled by strong leadership in the development of sentiment among athletes and by an administration that counteracts the influence of the spectator.

6. There is a tendency to violations of the principles of classification in any group which under the law of participation narrows participation. This tendency is seen under simple conditions and in small groups where the older, stronger, and more aggressive eliminate the younger, weaker, or timid from certain games. It is seen under complex conditions in large groups where there is a temptation to neglect players less skilled than the few best or to use players not legitimately members of the group. The tendency to violate an accepted classification and thus to gain an advantage is strikingly exaggerated through the pressure of partisan rivalry, the interests of the professional coach, and suspicion of rivals in intergroup contests. This tendency may be minimized by educational leadership that will control the influence of partisan and coach. Public opinion may here be very effective. (See AMATEURISM.)

7. There is the tendency for athletics to come under the control of the spectator and develop into specialized intergroup partisan contests, which in turn tends to destroy general participation and the social respect for athletics. This tendency is especially strong in the later years of youth. With the development of intergroup contests, the desire to win tends to become extreme. Group pride is involved, and success coveted as an honor. This intensification of the desire to win and the exaggeration of the importance of winning tends to destroy the character of athletics as play. Training for skill is pushed to the limit of youthful endurance, which, though the discipline may be commended, few individuals are capable of enduring. Exceptional individuals must carry the burden, so there is selected a special group of athletes on which spectators,

coaches, and managers focus their attention: leaving the majority of the group forgotten and neglected. Exceptional individuals are scarce, hence partisans search for them, and proselyting, or recruiting methods develop, which tend to corrupt violations of the laws of classification. Even for the exceptional athlete, play is changed into work, and the energy and time consumed the maximum. As a natural result there develops in some athletes the question: What is there in it? This the partisan tends to meet by extra encouragements, inducements, honors and rewards, and petty professional practices develop which are perpetuated by custom and the enthusiasm of partisans. The extreme specialized training aggravates the lesser tendencies to evil, to avoid which artificial methods are adopted. Trainers, rubbers, and the training table are employed to meet the physical needs; officials are multiplied to minimize the tendencies to unsocial acts and violations of the rules of the game; and complex eligibility codes are formulated to reduce the tendency to ignore the laws of classification.

Both the managerial and instructional functions tend to become totally divorced from the play needs of the masses of youth and to become highly specialized agents of the spectator. The coach, being judged by the results of contests, concentrates his efforts on exceptional athletes. The manager, being dependent on the spectator for finances, tends to manage solely in the interest of the spectator. This management and the expenses connected with the equipment of teams, cost of games and trips, officials, training tables, coaches, trainers, rubbers, doctors' bills, medical supplies, honors, rewards, privileges, etc., tend to surround athletics with a strong commercial atmosphere unwholesome and destructive to the play spirit. The final tendency of partisan athletics is toward a business, involving a few specialized athletes performing for the satisfaction of partisans, which is essentially professional in methods and commercial in character. Youth tends to lose all sense of athletics as a natural, valuable, and dignified activity, and public opinion tends to consider athletics merely as a spectacle. How far this evolution will proceed in the organized athletics in any group will depend upon the age of the contestants and the elements to be considered under control.

Several factors tend to exaggerate the specializing influence of the spectator. The press associates partisan contests not with educational topics, but with professional baseball, prize fighting and horse-racing gossip, thus misguiding public opinion. Educators, concentrated on intellectual education, tend to avoid leadership in the outdoor life of youth. They tend to leave managers, coaches, and players without supervision, subject to the domination of partisans, and free to use their own methods. Winning teams have been associated with the advertising movement, especially in colleges, and this leads educators to tolerate unwholesome practices. The same results flow from suspicion of rivals.

Of these several tendencies to evil in athletics, the first three, or the tendencies to physical injury, overindulgence, and specialization reduce or destroy the valuable physical results of play; the fourth and fifth, or the tendencies to bad manners and violations of the rules of the game, reduce or destroy the valuable moral results; the sixth and seventh, or the tendencies to violations of the law of classification and to control by spectators, reduces or destroys the educational values of athletics for the many, and the social respect for athletics among serious people.

It is clear that the tendencies to evil increase in seriousness as youth approaches maturity, as the intergroup organization becomes emphasized, and as the partisan spirit develops.

Control. — The importance and the values of athletics in the life of youth, the factors controlling participation and the tendencies to evil, show a need of administrative authority with larger vision and broader educational powers than are possessed by youth. Experience has shown that the play life of both children and youth must be supervised, if the values of play are to be secured and the evils eliminated. This control becomes increasingly important with the advancing years of youth because the factors tending to eliminate from participation and the tendencies to evil become more influential. The values of athletics are the normal product of the athletic impulse; the evils are the product of the ignorance of youth, social influences beyond its understanding, and the neglect of natural leaders or teachers. Youth is helpless alone to understand or control the factors influencing participation or the factors causing tendencies to evil. Educators or social workers start a reform wave when they realize that neglect has divorced athletic influences from the aims of education, that the masses of youth have lost the habit of, and respect for, participation, and that public opinion through lack of respect is unfavorable and depressing to the general spirit of play among youth. Attempted reform often precipitates an athletic struggle between the reform interests and the interests in control of the athletics to be reformed. Potentially or actually this struggle exists under all conditions because of the contrast in tendencies between the two primary interests in contests and a corresponding contrast in public opinion. Between the two primary interests a transitional mixture of the two exists which causes most of the struggle. These three interests give three general concepts of what athletics are for and whom they they are for, to which all current opinions and attitudes refer and which determine all policies and methods in the administration of athletics.

These concepts may be formulated as follows: (1) Athletics are solely for the pleasure of the spectator and the profit of the athlete who furnishes the pleasure. (2) Athletics are primarily for the pleasure of the spectator, especially the partisan sympathizer, and secondarily the pleasure or honor of the athlete. (3) Athletics are primarily for the benefit of the athlete seeking pleasure, and achieving organic and social power, for the fellowship, sympathy, unity, and loyalty among members of the team and (where intergroup teams exist) among the members of the social group which the team represents. If athletics are organized and administered on the first of these concepts, there arises pure professional athletics, or athletics for the spectator. This concept has its legitimate place; to it, in respectable expressions, there have been no serious objections so long as it keeps its place. If athletics are organized and administered on the third of these concepts, "educational athletics," as defined above, are the result. If athletics are organized and administered on the second of these concepts, there develops a class of athletics somewhere between "educational athletics" and professional athletics, which are seldom truly educational, and more seldom frankly professional. The tendency they take depends upon the class of characters dominant in the control of their organization and administration. In this concept there is nothing that is distinctly independent of the other two. It is a transitional mixture of the two primary interests. In it there is nothing that does not logically belong to the first or third concept. It is based on misguided notions, half evolved customs, and incomplete logic.

Again, if the first concept is accepted, the policies will center in one position: "get the best talent possible" and satisfy the spectators. If the second concept is accepted, the desires of partisans and anxiety concerning questions of material for winning teams will be paramount in the development of administrative policies, always with an exaggeration of tendencies to evil. If the third concept is accepted, the only position that can be taken is: athletics are for the education of all youth irrespective of athletic skill or ability to make pleasure for spectators, bring "honor" to a group, or satisfy the pride of partisans. This concept and its interpretation does not necessarily abolish pleasure for the spectator, nor the possibilities of his education as a spectator, but it determines absolutely the primary point of view in the creation of administrative policies and methods. It determines the relative amount of time that should be devoted to vigorous muscular activities as compared with other educational activities, the obligations of institutions to furnish opportunities for participation by all and instruction for all, the organization of activities to meet all needs and capacities and to conserve primarily the interests of the many, the attitude on violations of the law of classification, recruiting and uneducational methods of developing teams, the supervision of the conduct of athletes in games, in training quarters and on trips, the character and number of games played, the character of instructors and managers, the financial methods, the kind of training methods, such as training tables, trainers, and supplies, the attitude in inter-institutional relationships, etc.

An effective control depends on public opinion and expert educational leadership. Effective leadership will be hampered by an unintelligent, careless, or vicious public opinion; public opinion, even educationally the best, can be effective only through technical leadership. Educational athletics for all can be fully realized only when the public sees clearly the distinction between athletics as an educational force in the life of youth and athletics as an amusement for the public, until it respects athletics as an essential element in the education of youth, fosters a spirit of competitive play, and supports an educational administration. Public opinion will take this position only when educational leaders see and cultivate this viewpoint. Effective leadership requires technical skill, knowledge, authority, and character to secure the participation of all and to avoid the evil tendencies.

To secure effective participation, an educational administration must supply three things. (1) It must supply opportunities in the form of equipment and activities that will meet the capacities, needs, and tastes of all. (2) It must supply instructors for all that are primarily interested in the education of youth, that are trained to recognize individual capacities, needs, and tastes, and that will give sympathetic leadership, encouragement, and stimulus, especially to the less fortunate, in the development of effective play habits. (3) It must supply an organization that is primarily concerned in conserving the educational rights of youth in athletics, that will inspire respect, and that will maintain a fair classification for competition.

To avoid the evil tendencies an educational administration must also supply three additional influences. (1) It must supply the technical knowledge and skill to give physical examinations, supervise the amount and character of activities, and care for minor injuries, thus avoiding the tendencies to evils that destroy physical results. (2) It must supply a moral leadership with knowledge and skill and character power sufficient to control bad manners and tendencies to violations of the rules of the games and all tendencies that destroy moral results. (3) It must supply a social leadership with educational ideals, independent character, and honesty sufficient both to lead the earnest, honest, and reasonable spectators and to control or ignore the narrow or selfish partisan in all tendencies to violations of the law of classification, the educational viewpoint, and the social status of athletics.

All these requirements in an efficient educational leadership demand specialists trained as educators in the use of vigorous play activities as educational subject matter. C. W. H.

Athletics in England. — Nothing in English school life has been more generously accepted and developed than the passion for athletics. It is sometimes said that this exaltation of athletics is an entirely modern feature in English school life. In a sense this is eminently true. Consciously and purposely we have accorded a place to games in our school curriculum, which would have been incomprehensible to the schoolmaster of ninety years ago. We have given athletics a definite status in school life. Nevertheless, it would be quite wrong to imagine that the worship of sport, as its detractors term the attitude, is the mere perversion of a modern and decadent age. Witness my Lord Chesterfield, who writes in 1740: "If you have a right ambition you will desire to excel all boys of your age at cricket, as well as in learning." Could a modern paterfamilias write more sagely? Witness too the same writer when he alludes to "your various occupations of Greek and cricket, Latin and pitch-farthing." Even the poet Cowper recalls with pride in 1781 that "as a boy I excelled at cricket and football." And when one inquires into the origin of some of the peculiar forms of football which are still played at ancient English schools, and is frankly told that the beginnings of the game "are lost in obscurity," or "are probably coeval with the school itself," can one imagine that the boy who led his side to victory in the old-established struggles of these schools was anything else but a hero in the eyes both of his schoolmates and of the ranks of society from which the school was recruited? But at the same time it is most certainly true that the last ninety years of education in England have placed the athletics of the schools and universities on an enormously higher plane.

To this several causes have contributed. In the first place, the rapid advance of industrial life and conditions, in the place of the less cramped, more active existence of our ancestors, has concentrated attention on physical fitness and well-being. Secondly, it must be remembered that since 1815 we have enjoyed almost undisturbed peace. Rugby football may not be as dangerous an occupation as fighting pitched battles. Nevertheless, with the aversion to the military spirit, which undoubtedly exists in England, the field of athletics came as a welcome outlet for the fighting spirit of the nation's youth. And lastly, and most important consideration of all, the advent of great headmasters like Arnold, who laid enormous stress upon the training of character as the real business of the English school, gave a very real impulse to the practice of athletics. As late as 1834, we find a headmaster of Winchester objecting to his scholars rowing a match against Eton, on the ground that it withdrew them from their work, and complaining of the "intemperance and excesses" to which such matches gave rise. When we find that one of the school crews starts at half-past five in the morning and returns about nine in the evening having dined en route, the Headmaster's hostility to this branch of athletics as thus conducted is extremely intelligible.

But the new impulse to the formation of character at school grasped at once the ready instrument which lay waiting to be employed and developed. Athletics became a serious part of school training, not so much to produce soundness of body and limb as to give an opportunity for a spontaneous exercise of those qualities of coöperation between members of the team, and of chivalry toward the opposition, which are after all the basis of subsequent civic life. It is a significant fact that the only sport which has never been able to obtain a real hold in the English school and university is the sport which involves mere individual and personal effort. The winner of the mile race at a school is a pale shadow compared with the captain of cricket; and yet the one receives a prize, the other nothing but responsibility. Briefly, therefore, the school has made athletics an essential part of its educational machinery; in the formulation of its ideals, it has surveyed the whole field of a boy's activities, and has accepted the guidance and control of all. The result has been the indefinite extension of organized games throughout the schools of England. Adoption of the same rules led at once to competition. In the case of rowing and cricket, agreement more or less complete early existed. Football was played under many different codes of laws, but by 1890 all the schools, with a few exceptions, had accepted either the Rugby or Association Code, and this opened up the way to interschool contests. Naturally the school games found their place in the universities to which the schoolboy proceeded, and by 1880, all over England, the games were being developed and improved by the aid of strenuous rivalry. Eton had played the first cricket match with Harrow, as far back as 1822; 1827 was the date of the first match at the same game between Oxford and Cambridge; 1829 saw the first intervarsity boat race; 1873 the first intervarsity Rugby match. At the present day, there is a rapid succession of interschool and university matches.

The universal acceptance by the schools of responsibility for the games has involved, of necessity, strict organization. At all the public boarding schools games are compulsory for every boy unless medically exempted. Even at the secondary day schools the same attitude is being, so far as possible, gradually adopted, though obviously the nonresidential character of these schools, and the fact that many boys come from a considerable distance, make it almost impossible to insist upon any hard and fast rules. But by carefully nursing school opinion, and by seeing that every boy has at any rate the opportunity of participating in the games, the modern day school is approximating more and more closely in this respect to the principles of the public schools. At the commencement of the school term, all the games are placed in the charge of the school captain, who is, as a rule, the senior color remaining in the school from the team of the previous season. With the assistance of the other old colors he arranges the whole school in a series of games, which is posted at once on the school notice board. Each game has its appointed captain, who is then responsible on each day when games take place for arranging the sides for the day. Any boy who is unable to play, and has got leave to be absent, must strike off his name before a certain time, and his place is filled, either by selecting a player from the next game — a method which involves some arrangement between the captains — or in some cases by making the games always contain more players than is absolutely essential, and thus allowing a margin for defections. From the top game the captain selects his school team or teams. A boy who has been misplaced in the games has no difficulty in making the misjudgment known; for, when not playing, the captain of the school and the members of the first game are continually undertaking the duties of referee in the lower games, while at some schools, matches are periodically arranged between the lower division of the higher game and the upper division of the lower game, in order to discover any injustice of placing. Naturally, the matches against other schools are the events of the year, and every effort is made by the captain to get together the best side the school can produce. The school matches are usually arranged toward the end of the season, so that by means of preliminary club matches an opportunity may be afforded of building up the best side available. It has been found that the standard of play in the lower games of the school is apt to lose place, when thirty boys or so merely repeat day after day the same performances against each other. In consequence, at all schools matches of some sort have been introduced — interhouse or interclass matches, for instance, for boys of all ages, and the same for boys under a certain age, or under a certain school game — and nothing has been found more useful than these, for bringing out into notice promising young players. During the season colors are awarded to the various teams or games, by the captain of the school. One of the masters is always president of the games committee, but his functions are limited to advice and guidance. The question of the finances of school games is very simple. Every boy who plays games pays a games subscription, usually very light. The money so provided, together with any other source of revenue which may be available, — for instance, the profits of the school "shop," — is devoted to the upkeep of the grounds. The boys pay their own expenses, in traveling to play other schools, and no gate money is taken.

At the universities the games are run on very similar lines, save that the undergraduate assumes entire active control of each branch of sport, with no dormant authority in the background. Each branch starts the season with its committee, consisting of the senior color, the captain or president for the current year, and of the other "blues" remaining over from the previous season. Trials are arranged for such players in residence as have either made their mark in previous years, or come fresh with reputations from the schools. By means of these, and the guidance afforded by intercollege matches, the captain and committee choose the university team, which takes its place among the English clubs, and is gradually built up into the final form which is selected to do service in the interuniversity match. The financial aspect of university sport differs somewhat from that of the schools. Every one who represents his university pays his subscription to the University Club, which is distinct in each case from the College Clubs which pursue the same sport. Out of this fund, and the gate money, which is taken at university fixtures, the bare expenses of each member of the team are paid, in accordance with the regulations of the English unions as to amateurism; by tacit agreement at the present moment, a player always loses a little in the incidental expenses of traveling. There are old players who would prefer to see university men paying all their own expenses; but with the amount of traveling which present-day athletics entail it has been considered best in the interests of the games themselves, and in order not to prevent the best talent at the university participating in the sports, to let players avail themselves of the practical basis laid down by the unions and associations. Needless to say, the limit is rigidly observed, and the accounts carefully managed by more or less permanent honorary secretaries. The affairs of the various college clubs within the universities differ in obvious points. No gate money being available, every club relies on its members' subscriptions, and the universal practice is for an undergraduate to pay a subscription to the combined athletic clubs of his college; he is then entitled to participate in any sport. In the case of exceptional expense, when for instance a college crew is sent to compete at Henley, a subscription is as a rule specially raised in the college to defray part of the expenses of the members of the crew.

On the subject of athletics there is undoubtedly at the present moment a certain division of opinion in England. That the sport of our schools and universities is scrupulously clean and honest, no one for a minute denies; nor again, does anybody question that the discipline of mind and body thus secured is extremely valuable for every boy — a discipline brought into play, not only on the cricket and football field, but also in the whole management and control of the school games. Nevertheless, even among those who grant all these contentions, there is often a real feeling of uneasiness, which may be attributed, as a rule, to one of three ideas. In the first place, there are those who are of opinion that the vigor and force of the nation might be much more profitably employed in these days than in passionate devotion to athletics. They think little of the "muddied oaf" and the "flanneled fool," regard his blind enthusiasm as something akin to madness, and piously hope that one day his ardor may take a more martial and patriotic turn. But the charge should not be laid upon the athlete as such. The great volunteer movement of 1860 went hand in hand with a vast athletic revival; the two were regarded as aiming at a single object, and if only the athlete were as convinced of the serious purpose of the one as he is with regard to the other, there would be no question of conflicting interests. Secondly, there is a much more justifiable reason for apprehension with regard to athletics. It is said that athletics have become the dominating factor in all our education, and that other interests and occupations are rapidly going to the wall. That there is truth in this charge must unfortunately be admitted. Games are excellent things to play, but when they become an obsession in boys' conversation, the result is deplorable. Boy nature admires physical much more easily than intellectual prowess, and the athlete bulks large in his view; small wonder, therefore, that with all the tinsel of athletic distinction which is dangled before his eyes, he tends sometimes to forget that athletics are not the real business of his life. Nevertheless, the danger is recognized, and it is not so alarming as is sometimes alleged, for a perversion can be corrected. Finally, some would maintain that the modern treatment of games as a serious part of school life is destroying the primary purpose for which a game exists — the purpose of relaxation and recreation. Here again we must to some extent plead guilty. The strain of athletics is quite a real thing. But on the other hand, even a change of occupation is recreation; and moreover, boys do get, under present conditions, as much time to spend irresponsibly as many schoolmasters think desirable.

Exaggerated, therefore, though the interest in athletics may sometimes be, they nevertheless perform a function in English school life, without which the educational machinery would seem grossly inadequate for the production of the ideals which are entertained. They have become bound up with the national virtues; they are part of the national life. D. G. S.

See articles on the respective English Universities and Public Schools.

College Athletics. — Athletics occupy a very large place in the life of American college students to-day, when we consider that the first intercollegiate contest in the United States was a boat race between Harvard and Yale in 1852. College athletics as we have them today are divided into four major sports, rowing, baseball, football, and track athletics; and about a dozen minor sports, basketball, lacrosse, soccer, cricket, tennis, golf, swimming, water polo, gymnastics, fencing, wrestling, bowling, and shooting.

The major sports are the oldest, rowing dating back to 1852, baseball to 1859, football to the early seventies, and track athletics to the late seventies. Most of the minor sports were introduced during the decade from 1890 to 1900. The growth of athletics in the colleges was rather slow from 1852 to about 1880, but the advent of track athletics and football added new impetus to the movement. Before 1880 the methods of conducting athletics were simple; there were no salaried coaches, no training tables and elaborate uniforms; the expenses were small, and they were paid mostly by the participants in the sports. After 1880 the attention given to athletics increased rapidly; elaborate methods of training were developed, expert coaches were engaged for teams, many new sports were taken up, and the number of students taking part in them was multiplied. The cost of maintaining athletics increased proportionately. The students interested in athletics failed to secure financial support from the college funds, and very soon learned that funds could be secured from gate receipts and enthusiastic alumni. They also learned from experience that the public and the alumni would give generous support to winning teams, but would soon withdraw their support from losing teams.

That situation was undoubtedly a large factor in bringing about a radical change in the character of college athletics. The old conception of securing healthful physical activity, wholesome recreation, and friendly competition for all students was superseded by the new idea of sacrificing everything for the sake of turning out a winning team. All the evils of professionalism, recruiting, neglect of studies, brutality, extravagance, etc., that have existed during the last twenty years are the result directly or indirectly of this inordinate desire to win at any cost because a winning team insures financial success. The annual receipts from admissions to games in each of several colleges amount to more than one hundred thousand dollars, and from a single football game to as much as seventy thousand dollars. The effect of such a policy upon the students was distinctly harmful. The exaggerated importance placed upon winning led to such a degree of specialization in athletics that only men of exceptional ability could earn a place on the teams. If men of exceptional ability were not found in the student body, they were recruited from the outside by offering them inducements in the form of scholarships or positions with light work and large pay.

One of the greatest defects is that the college equipment for exercise is monopolized by the teams, with the result that the main body of students who need the exercise most, must content themselves with the exercise involved in "rooting" for the teams. The amount of time and energy required of the athletes is so great that many of them are unable to maintain satisfactory academic standing. The standards of extravagant living, the newspaper notoriety, and the hero-worship enjoyed by the successful athletes during their athletic career leave them after graduation with extravagant habits of living not in accord with their financial and social position. Another most unfortunate result of placing undue emphasis upon winning athletic contests is in the practice of gambling upon the outcome of the games. Many students acquire the gambling habit while under the influence of the hysterical excitement over college athletic contests.

These evils exist in varying degree in many colleges; they reached a climax during the period from 1900 to 1905, when the situation was revealed through discussion in the public press. The death of a college student during a football game, and the reports of a large number of serious injuries to football players, precipitated a widespread outcry for reform. A conference of representatives from all the colleges and universities was called in New York in 1905 to consider the problems of athletic reform. Seventy institutions responded by sending official delegates. The result of this conference was the organization of the Intercollegiate Athletic Association of the United States. The policy adopted by the association was to institute a campaign of education in athletic administration through annual conferences, committee reports, discussions, and publication. The results thus far accomplished are most encouraging. The evils of professionalism, proselyting, extravagant expenditures, the training table, and too long schedules of games have been greatly lessened. The playing rules of football have been improved, and provision made for more efficient officials to conduct the games.

Another very important result of the publicity given to problems of athletic reform is a fuller realization by college authorities of their responsibility in correcting existing evils. The conviction is growing among college officials that athletics when properly conducted contribute to the physical, moral, and social development of college students. But, in order that such results may be obtained, athletics must be administered in much the same way as other branches of education. It is necessary to accommodate all the students in the institutions; it is also essential to appoint a director or manager to organize and direct the athletic activities.

College athletics are now passing through a period of transition. There are three distinct policies advocated by different groups interested in the problem. The younger alumni (particularly those who were prominent in athletics when undergraduates); some of the undergraduates; the "sporting element" of the public; and the large number of business men who represent the transportation, hotel, and other interests that derive financial benefits from athletic contests, advocate the policy of *laissez faire* toward commercialized athletics. A small group, including some college officers, a few of the older alumni, and some parents of college students take the opposite view and advocate the prohibition of all intercollegiate athletic contests. The majority of college officers, a large proportion of alumni, many undergraduates, and the majority of their parents advocate more educational athletics for the mass of students and the careful supervision and control of intercollegiate athletics by college authorities. That the advocates of this policy are numerous and influential is evidenced by the present trend of college athletics.

In 1905 college athletics were controlled almost entirely by students and alumni, under the supervision of an athletic board made up of a minority of faculty members and a majority of alumni and undergraduates. Since 1905 a gradual change has taken place in methods of organization and control. The aims sought by the various colleges and universities are essentially the same; *i.e.* to encourage and develop intramural athletics for the mass of students, to curtail and control intercollegiate athletics by appointing a director or manager of athletics responsible to and paid by the college authorities. In the smaller institutions this responsibility is given to the gymnasium director, but in many of the large colleges and universities a graduate manager of athletics is appointed to give all his time to the work under the direction of the president or a special committee appointed for the purpose.

The problem of controlling intercollegiate athletics includes three parts. First, the control of finances, — this is accomplished by requiring managers of athletic teams to submit budgets at the beginning of the season; to order all supplies on official order slips; to pay all bills by check, all order slips and checks to be countersigned by the graduate manager; and to require a detailed financial report at the end of the season. Second, the control of athletic policy; schedules of contests; absence of students from academic exercises for the purpose of athletic training and competition; appointment, supervision, and dismissal of employed coaches and trainers; and the care and maintenance of college property used for athletic purposes — all these matters are controlled by the graduate manager. Third, the control of students representing the institution in intercollegiate athletic contests. Every student desiring to participate in such contests is required to answer questions on a printed blank concerning his amateur standing, submit to a medical examination, and maintain a definite standard in scholarship.

The results already obtained are most encouraging. In colleges where a few years ago baseball was played only by fifteen or twenty expert players on the "varsity" squad, there are now scores of students organized into class, dormitory, and fraternity teams; where only two "eights" were in training for the "varsity" crew, there are as many as ten or even twenty crews getting the benefit of this delightful sport.

Tangible results are apparent also in saner methods of conducting intercollegiate athletics. The control exercised by a competent man with authority is efficient in setting up and maintaining high standards of conduct and management in all phases of intercollegiate athletics. Further development along these lines will undoubtedly result in correlating athletics with the intellectual and social activities of college life, and thus enhance the value of a college education in fitting young men for life.

An indication of the proportion of students participating in some form of athletic activity in American colleges may be given from the following table. Out of about 80,000 male students in the colleges represented in this entire inquiry 32 per cent are engaged in some form of athletics. Out of about 26,000 female students 18 per cent are engaged in some form of athletics. The reported figures for a typical list of institutions are as follows:—

	No. of Students		No. of Students Engaged in Athletics	
	Male	Female	Male	Female
Adelphi College	60	440	10	50
Amherst College	550	—	400	—
Bowdoin College	350	—	300	—
Colgate University	2087	—	200	—
Colorado College	328	250	300	200
Columbia University	3000	1500	500	200
Cornell University	3150	350	1200	—
Dartmouth College	1197	—	300	—
Dennison University	312	240	150	100
Dickinson College	483	97	322	—
Harvard University	3918	—	2000	—
Haverford College	150	—	120	—
Johns Hopkins University	613	30	50	—
Lehigh University	720	—	300	—
Leland Stanford, Jr. University	1000	500	227	25
Miami University	287	244	95	25
Swarthmore College	156	203	156	203
Syracuse University	2000	—	1500	—
U. S. Military Academy	600	—	600	—
University of California	1728	971	500	100
University of Chicago	1380	920	225	150
Bryn Mawr College	—	420	—	378
Vassar College	—	1014	—	100

The special aspects of the problem of educational athletics are discussed above under the appropriate caption. See below for athletics in Secondary and Elementary schools. See also the various games, such as Baseball, Cricket; Rowing, Swimming; see also Athletic Field; Dancing; Gymnastics; Hygiene, Personal; Hygiene, School; Playgrounds; etc.

G. L. M.

Secondary Schools.—*Stages of Development.*—Athletics for high school boys seem to be passing through three distinct stages as regards the attitude of the school authorities. First, opposition; second, toleration; third, coöperation. It is not many years since school authorities looked upon athletics as a positive evil, and not only refused to allow the schoolboys to take part, as representing the schools, but absolutely opposed such activities. After a time they began to realize that boys were sure to engage in athletics, whether the school authorities gave their permission or not, and a period of toleration followed. The result was that teams competing under the school name frequently brought discredit upon the school and caused principals and teachers considerable annoyance. The difficulties were practically solved when the teachers took hold with the boys and helped to organize the sports and to provide the necessary accommodations.

Organized Athletics. — The problem of control has been made difficult through neglect, but organized athletics in the elementary school is helping to improve the situation by developing a proper spirit among the boys and bringing them to appreciate the necessity of rules of eligibility and competition. It is reasonable to hope that well-organized athletics in the elementary and high schools of the country will help solve the problems of athletic control in colleges and universities. Coöperation of other athletic associations, as the Amateur Athletic Union, the Military Association, etc., is absolutely necessary in order to enable the school authorities to enforce their authority, and is usually given. A few test cases bringing home to schoolboys the fact that they can have no standing in other clubs or associations unless they preserve their athletic standing in their school are sufficient to fix the authority of school officers.

Rules of Eligibility. — The following rules of eligibility are taken from the handbook of the Public Schools Athletic League of New York City.

No high school pupil shall represent his school unless he has attended a school for twenty school weeks, except

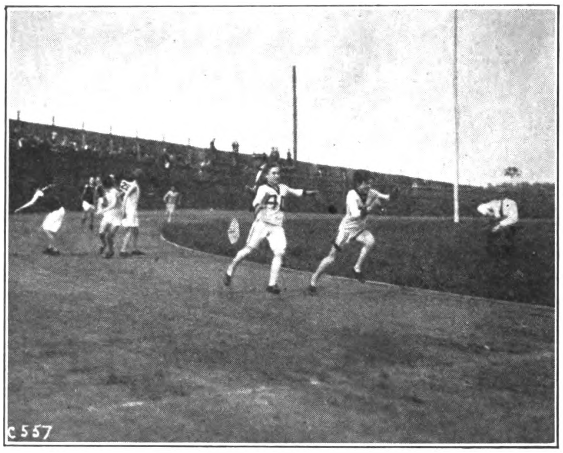
(*a*) He has been promoted from an elementary school, whereupon he shall be eligible immediately;

(*b*) He has been admitted from a school outside the New York Public Schools, whereupon he shall be eligible after an attendance of twenty school days.

No high school pupil who has reached the age of twenty-one shall be eligible to represent his school in any branch of athletics.

A boy shall be eligible to represent his school in athletics during any "marking" interval who has placed 14 hours (13 hours) of prepared work to his credit at the last rating in the office records.

Public Playground, Jersey City, N.J.



Relay Race, Elementary School Boys.

Cross Country Run, New York City High Schools.

Athletic Meet of the Colorado Springs School.

ATHLETICS IN THE SCHOOLS.

NOTE. — In those high schools where physical training is not conducted according to the syllabus 13 hours, instead of 14, shall be considered as constituting eligibility.

N.B. — Drawing and shop work in manual training schools shall count one hour for two.

Any extraordinary case shall be submitted to the high schools Games Committee.

A graduate of a three years' course in the high schools who returns to take up postgraduate work is permitted to take part in athletics, providing he is eligible according to the rules of the Public Schools Athletic League.

No pupil who is a graduate of a four-year secondary school course shall be eligible to represent any school.

Only those pupils who are taking full work in a regular course shall be eligible to represent the school.

No pupil shall be allowed to compete in the mile run unless he has reached the age of sixteen years and six months. No pupil shall be allowed to compete in the junior events if he is sixteen years old or older. A birth certificate shall be accepted as proof of a high school junior's age. If such certificate cannot be secured, other evidence may be submitted to the High Schools Games Committee.

Any boy who has matriculated in any college or who has played on a college team shall not be eligible to represent a high school.

No entry shall be accepted unless countersigned by the principal or the school's representative on the High Schools Games Committee.

Any high school pupil known to have bet or acted as an agent for others in betting on athletic contests shall be debarred from competition for one year.

Safeguards. — In the secondary schools the events are graded on a plan similar to that in the elementary schools, and a limit is placed upon the number of events in which a boy may enter. All boys taking part in the interschool competitions are required to present a certificate signed by a reliable physician stating that they are physically able to participate. Effort is made to eliminate from the list of events those that present any danger of serious injury to the participants. As an example of this, football under college rules has been discouraged by the League. In New York City soccer football is played as a substitute. The game of soccer is free from the dangers of mass plays and tackles, and offers an opportunity for all boys to take part. The small boy has an equal chance with the larger fellows. In fact, he is frequently able to outplay his bulky opponent.

Events. — The generally accepted events for secondary school boys are: 100 yard dash, 220 yard run, 440 yard run, 880 yard run, 1 mile run, 100 yard hurdles, 120 yard hurdles, 220 yard hurdles, half mile and mile relays; running broad jump; running high jump, pole vaulting, putting 12 pound shot, discus throw, basketball, baseball, soccer football, cross-country running, tennis, swimming, skating, marksmanship.

Values. — Among the objections that are raised against athletics for schoolboys are the following: Overstrain, unfair tactics, too much publicity, and too much time and attention. On the other side there are positive advantages of well-organized athletics, such as the development of courage, decision, alertness, tenacity, resource, obedience, restraint, fairness, coöperation, self-sacrifice, and generalship. The outlook is exceedingly hopeful because the advantages so manifestly outweigh the disadvantages, and because under a well-organized system the evils may be practically eliminated.

Elementary Schools. — " Organized for the purpose of giving athletics a proper place in our schools " is the reason given by the President of the Public Schools Athletic Association of Newark, N.J., for the formation of his Association. " To develop the rational activities of the boys and girls " is another significant quotation from the handbook of the same organization. The declaration of purpose set forth by the Public Schools Athletic League of New York City is, " to provide healthful, joyous, and constructive play, folk dancing, and athletics for every boy and girl."

School principals, teachers, and boards of education are coming to realize that it is greatly to their advantage, as well as a matter of simple justice, to coöperate with the pupils in their athletic activities. Evidence of this is the formal organization of public schools athletic leagues in the following cities: Baltimore, Md., Birmingham, Ala., Buffalo, N.Y., Cincinnati, Ohio, Cleveland, Ohio, Fitchburg, Mass., Kansas City, Mo., Newark, N.J., New Orleans, La., New York, N.Y., Pittsburg, Pa., Racine, Wis., San Francisco, Cal., Seattle, Wash., Springfield, Mass., Syracuse, N.Y., Tacoma, Wash., Troy, N.Y.

The Beginning in New York City. — Since the work in New York City is typical of what is being done throughout the whole country, some reference to its inception and development may be in order. The first step was the formation of a voluntary organization by schoolmen and citizens interested in helping boys in their athletic sports; then the extension of the work so that the great mass of boys and girls were reached; and finally official recognition by the school authorities.

In 1903 the Director of Physical Training of the New York public schools, together with the City Superintendent, members of the Board of Education, principals, and other public-spirited citizens met to consider what might be done to provide opportunity for wholesome athletics for boys in the public schools. Following this, a meeting of principals was held at which a definite plan for the organization of a league was presented. The proposition met with general approval, although some were skeptical about the possibility of making it succeed. In order to bring the matter before the public and the schoolboys themselves, a set of games for all the schools of the city was held in Madison Square garden. It was by far the largest athletic meet, as regards the number of competitors, that had ever been held. Some 1500 boys took part. The usual track and field events, such as the 50 and 100 yard dashes, relay races, broad jumping, high jumping, shot putting, etc., were the only ones attempted at that time. From that beginning there has been built up a great system of athletics that reaches not only the few athletically inclined boys, but the whole mass of boys and girls in the public schools. This has been brought about by inaugurating special forms of competition. Two of the most successful of these are "class athletics" and the "athletic badge test."

Class Athletics. — "Class athletics" is a form of competition in which the whole membership of the class takes part, and a record is made, not by individuals, but by the class as a whole. One of the events in this form of athletics is the standing broad jump. Every boy in the class must jump. The records of all jumping are added together, and the total distance jumped is divided by the number of boys taking part, thus giving the jumping ability of the class as a whole. This record is compared with those of other classes of the same school grade, and the class making the highest record is awarded a trophy, which may be hung up in the classroom until the next season, when it is again put up for competition. This plan does away with the objection that is often raised that the athletic games provide for the experts only, and that these are not the ones in greatest need of its benefits. It reaches the boy who does not usually take part, and class spirit forces him to train conscientiously and do his very best at the time of the competition. During the season for class athletics it is no unusual sight to see classes in groups on the athletic fields or in alleys practicing the event that is soon to take place, the more expert coaching the others, and altogether developing a class spirit that is wholesome and good. Another advantage of this form of athletics is that the small class has as good a chance of winning as the large classes.

Athletic Badge Test. — The "athletic badge test" is another form of competition distinctly different from all other kinds of athletics, in that it is not necessary to defeat some one in order to win. Every boy who can bring himself to the prescribed standard of physical efficiency, and who at the same time is doing satisfactory work in school, may win an athletic badge. The boys are divided into two classes for the competition, and events are prescribed suitable to each group.

Boys under 13 years of age have the following standards: 60 yard dash in 8⅗ seconds; pull up 4 times; standard broad jump, 5 feet, 9 inches.

All other elementary school boys have the following standards: 60 yard dash in 8 seconds, or 100 yard dash (out of doors) in 14 seconds; pull up 6 times; standing broad jump, 6 feet, 6 inches.

When the tests were first made in New York City, whole classes were found in which no boy could pull himself up once. In fact, less than 2 per cent of those taking the test the first year were able to qualify. Five years later 59 per cent of the boys in one school won badges, and in many schools from 40 per cent to 50 per cent of the boys were able to qualify. These badges are greatly prized by the boys, because they stand both for athletic ability and satisfactory work in the school.

Eligibility. — The development of star athletes is not the business of a public school athletic league. Its activities should be so closely correlated with the work of the school that they will result in a better school spirit, better classroom work, better deportment, and better health. One of the first considerations, therefore, is that of eligibility, and all agree that every boy who takes part in the school athletics should be doing satisfactory school work. He should have a passing mark in effort, proficiency, and deportment.

The competitions which begin in an informal way are sure to become more and more strenuous and intense. Interschool rivalry develops to a marked degree, and the pressure becomes constantly greater to relax on the eligibility requirements and let the more expert take part in order that the school may win. This is one of the chief dangers. The principal should be given absolute authority, under the rules, to control competition in his own school, and must be held ultimately responsible, both as regards eligibility and conduct in the games.

Standards of Classification. — Classification of the boys taking part is another necessity. That is, they must be divided into groups so that those shall come together in competition who are of the same general physical ability. Grouping was first tried on the basis of age, and two classifications were made; boys under 13 years of age, and all other elementary school boys. Serious objections were found to this classification. First, that it was difficult to guarantee that the boy rightfully belonged in the group in which he was placed. Boys of the same age differ greatly in physical development, and it did not seem fair that a boy 5 feet tall should be competing against a boy 4 feet tall, and suspicion that the 5-foot boy was older than he professed to be was a natural result. Second, by extensive tests it was found that a boy's weight is a better index of his physical ability than is his age. Therefore, the classification by weight was adopted, and the following limits set: 80 pounds, 95 pounds, 115 pounds, and above.

For the track and field games the boys were weighed at the time of competition. In team tournaments extending over a considerable length of time it was found necessary to weigh the boys at the beginning of the tournament only. Objections have also developed to this classification, due largely to the great interest and the vigor of competition. In order to keep under the weight limits, boys have been found to "train down" by taking frequent Turkish baths and by starving themselves just before the competitions. This has been met by the rule that any boy who is found to have "trained down" in order to come within the weight limits shall be debarred from competition.

In New Orleans classification by height has worked out very satisfactorily. A recent suggestion is that the boys should be classified on a combination basis of age, height, and weight. That is, Class A might be all boys whose age in years, plus one half the height in inches, plus one quarter of weight in pounds, shall not exceed 62. There is no doubt that some such plan as this would make a perfectly fair classification, but its practical working is not certain.

Limiting Competition. — Another leading consideration in athletics for schoolboys is that of limiting the competition both as to the severity of the events and the number of events entered. The events for the different groups must be so arranged that the distance for the race, or the length of playing time in the game, shall absolutely prevent overstrain. One of the events that is hard to regulate from this view point is the "pull up." Consequently it has been criticized, and in some cities dropped from the list. Beginning with the moderate requirement of 4 pull ups in the athletic badge test, the boys have gone on practicing in this event until some are able to make a record of 40, or even more. Although the strain may be no greater than that in other forms of athletics, the competition cannot be controlled sufficiently to make it an absolutely safe event.

Limiting the number of events in which a boy may take part is another definite means of safeguarding him in the games. In the large city systems, where hundreds of boys are entered in the same event, and where there must of necessity be the trials, the semi-finals, and finals in all the races, it is usual to limit elementary school boys to one event only, with the possible exception of raising it to one track event and one field event. In small cities, where the entries are small, and where only one "heat" is necessary in any race, the boys may be allowed to enter more than one event. Limiting the number of events participated in has another advantage which is not at first apparent. It distributes the competition and gives a large number of boys an opportunity to take part. For example, a school may be allowed to make 25 entries in a set of games. If there were no limit to the number of events a boy might enter, it would be possible for 3 or 4 boys to represent the entire school, but by limiting the entry to one event for each boy, 25 boys are given a chance to take part.

Athletics for Girls. — Athletics for the girls is a natural outgrowth of the organization of school athletics, and the mistake has quite generally been made of attempting to use for the girls the same kind of competition that has developed for the boys. One writer on the subject says, "I wish that we might break away entirely from the idea that in order to have athletics for girls we must approach the subject from a man's point of view, and that we might face the issue squarely and evolve our own individual, natural sports, regardless of whether or not they coincide with those of men." Athletics for girls might well be considered from the following standpoints, as suggested by the Inspector of Athletics for girls in New York City: First: What exercises are likely to be injurious to the girls? Second: What exercises are mechanically suited to the ability of the average girl? Third: What exercises are best suited to her muscular strength and endurance? Fourth: What forms of exercise will contribute to her health and vitality, and help to fit her for a normal woman's life? Fifth: What forms of physical activity come nearest to containing for her the primitive appeal that athletics in the accepted sense hold for the boys?

The following are some of the events recommended by a special committee of the Playground Association of America: (*a*) For the immature girl, — archery, ball throwing, folk dancing, low hurdle racing, running short distances, rowing, skating, swimming, tennis, walking. (*b*) For the mature girl, — the same events as above, plus basketball, climbing, field hockey, and indoor baseball. Other events that are used with satisfactory results are the potato race, Indian club race, and volley ball.

Effect upon the School. — The leading consideration in athletics for school children must always be that of the effect upon the school. In cities where this work has been organized and given a fair test, school authorities are practically unanimous that: (1) Class work is better. (2) The health of the school children is improved. (3) A wholesome school spirit is developed. (4) There is less trouble about discipline, owing to the closer relation and better understanding between the pupils and teachers. A district superintendent in the New York City schools recently declared at a public meeting that organized athletics had done more to break up truancy in his district than any other thing that had been tried. The following quotation from a letter written to the Secretary of the New York City League by a school principal is typical of the attitude of teachers, principals, and superintendents: "Permit me to add a word of commendation to the many you have received, for the excellent work your association is doing toward developing a love in our public schools boys for clean athletics. These sports, I believe, improve our boys, not only physically, but also mentally and morally. This conclusion has been the result of my personal observations extending over about four years. I have known of many cases where boys who had previously been quite neglectful of both studies and conduct in their classes, showed marked improvement in both lines after entering into athletic contests. I have yet to find the boy who has done poorer work at school because of these sports. Many times the leaders in athletics have also been the leaders of their class in their studies."

Progress of the Movement. — Mention of a few special features of the development in school athletics throughout the country may serve to indicate the progress of this work. In Cleveland, Ohio, where the athletics were organized and conducted for a time entirely without official recognition by the school authorities, the school board has adopted resolutions which are in part as follows: —

> "Athletic events and games are constituted a regular division of the course of physical training, and shall be provided for under the supervision of the Department of Physical Training in such manner, approved by the Superintendent of Schools, as shall subserve the purpose of physical training as herein stated, and be so arranged that every public school pupil desiring to do so may be able to participate in activities of this nature appropriate to his age and development."

The resolution states in detail the regulations that shall govern participation in the various athletic events.

In Tacoma, Wash., a magnificent stadium has been constructed for the public school boys at a cost of approximately $80,000. A considerable part of this sum has been donated by the business men of the city. In New Orleans much attention has been given to the development of indoor baseball played outdoors as a substitute for the regulation baseball game. This was done as a means of making baseball possible to large numbers of boys where playing space is exceedingly limited. It is reported that this form of baseball is exceedingly popular. Over 80 teams participated in a recent tournament. The Public Schools Athletic League of Troy, N.Y., has pursued a noteworthy course concerning medals and trophies. Trophies are given to the schools only, and even then they do not become the permanent property of any school, but are competed for annually. No medals are given to individual competitors in the games. A careful record of those securing first, second, and third places in the various events is kept, and at the end of the year a big athletic celebration is held. Addresses are made by the mayor, councilmen, superintendent of schools, and others, and the boys who have won in any event throughout the year are called to the platform and presented with a ribbon badge by the president of the League. This avoids the evil of excessive prizes, and serves as a big rally day for all the schools, at which school spirit runs high and the citizens are shown what the schools are doing in this department of their work. Baltimore has an unusual organization known as the Public Athletic League, one department of which has to do with athletics for the schoolboys in coöperation with the school authorities, and another department conducts the public playgrounds chiefly during the summer recess. In Newark, N.J., a splendid athletic field has been provided for the public schools at a cost of $75,000.

Athletic Courtesy. — One of the benefits of organized athletics for schoolboys is the opportunity that is afforded for practicing those manly virtues that mean so much to success in after life. One public schools athletic league prints in its handbook the following standards, and emphasizes them to the boys as the ideal in athletic competitions: (1) The rules of games are to be regarded as mutual agreements, the spirit or letter of which one should no sooner try to evade or break than one would any other agreement between gentlemen. The stealing of advantage in sport is to be regarded in the same way as stealing of any other kind. (2) Visiting teams are to be honored guests of the home team, and all their mutual relationships are to be governed by the spirit which is understood to guide in such relationships. (3) No action is to be taken nor course of conduct pursued which would seem ungentlemanly or dishonorable if known to one's opponent or the public. (4) No advantages are to be sought over others, except those in which the game is understood to show superiority. (5) Officers and opponents are to be regarded and treated as honest in intention. When opponents are evidently not gentlemen, and officers manifestly dishonest or incompetent, future relationships with them may be avoided. (6) Decisions of officials are to be abided by, even when they seem unfair. (7) Ungentlemanly or unfair means are not to be used, even when they are used by opponents. (8) Good points in others should be appreciated and suitable recognition given.

Progress. — The Board of Aldermen of New York City has made an appropriation of $500,000 for the purchase and equipment of athletic fields for schoolboys, and has placed these fields under the direction of the Board of Education. The military authorities of the city have been most courteous in allowing the use of their armories, not only for sets of games, but also as practice places for the schoolboys after school hours. In the rapidly growing cities of the West the authorities are realizing the necessity of setting aside space for play and athletics. A bill presented in 1909 before the Legislature of the State of Washington prescribed a minimum limit of 100 square feet of play space per child in connection with all new sites for school buildings. Although the bill failed to pass, it is significant that such a measure should have been presented, and that it had the unqualified indorsement of the State Superintendent of Schools.

Statistics. — In 1904–1905, J. H. McCurdy, M.D., of the Springfield Y.M.C.A. Training School, made a careful study of the extent of physical training and athletics in the public schools of 555 cities in the United States. These cities included 58 having a population of over 50,000, 48 having a population of from 25,000 to 50,000, 153 having a population of from 10,000 to 25,000, 210 having a population of from 5000 to 10,000, 86 under

5000 population. Among the 555 cities, 128 were found to have special teachers of physical training, and 102 of these had high school athletic organizations. In the 427 cities without special teachers of physical training, 243 had high school athletic organizations, making a total of 345 cities, or about 62 per cent of the whole number, having such organizations. The school superintendents were asked to state their position concerning competitive athletics in high schools. In the 555 cities, 438 approved, 27 disapproved, 8 were doubtful, 82 did not answer. The popularity of the different branches of athletics is shown in the following statistics taken from this same study: In the 555 cities 432 high schools have football teams, 360 high schools have baseball teams, 213 high schools have basketball teams, 161 high schools have track teams.

The questionnaires indicated that the superintendent put considerable emphasis upon plays and games, and desired to place in charge of the boys' sports competent supervisors, who should be members of the faculty.

L. F. H.

See also the articles on the various forms of athletics, *i.e.* BASEBALL; CRICKET; see also AMATEURISM; ATHLETIC FIELD; GYMNASTICS; HYGIENE, PERSONAL; HYGIENE, SCHOOL, etc.

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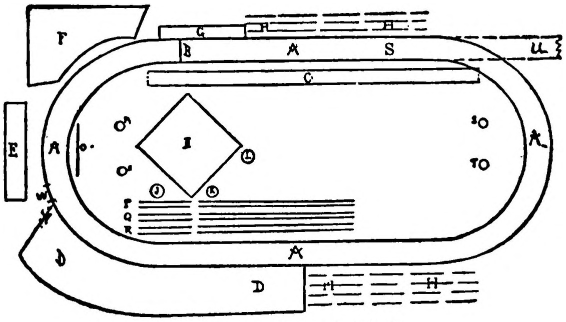
ATHLETIC FIELD. — An athletic field is an essential part of the equipment in every educational institution. The size and arrangement of the field vary according to the character of the institution and the number of students to be accommodated. Some of the large colleges and preparatory schools have from 20 to 30 acres laid out for baseball, football, track and field sports, and lawn tennis. Other institutions located in or near cities where land is expensive have smaller fields, often limited to a few acres. There is a marked tendency to increase the equipment for outdoor sports and games in schools and colleges. Many new and growing institutions have made the mistake of not acquiring sufficient land for athletic fields when land was cheap, and later found it impossible to secure adequate space. The minimum area necessary for an athletic field to accommodate 500 to 1000 students in outdoor sports is about 6 or 7 acres.

The location of the athletic field is of utmost importance. The ideal location is adjoining the gymnasium building; when this is not possible, the field should be as near the gymnasium as possible. Experience has shown that the value of a field to the students decreases rapidly as the distance of the field from the gymnasium increases. When the athletic field is located more than a quarter of a mile from the gymnasium and campus, the following difficulties are encountered: (1) Students object to the loss of time and energy involved in walking to and from the field; (2) If dressing and bathing facilities are not provided at the field, students object to walking to and from the field in exercising costume, and they are more liable to take cold after exercise; (3) If dressing and bathing facilities are provided at the field, the cost of construction and administration is greatly increased. A small field near the gymnasium is usually preferable to a large field half a mile or a mile away.

A typical athletic field containing a playing field for baseball, football, lacrosse, soccer, field sports, quarter mile running track, tennis courts, grand stand, etc., requires a field 400 by 700 feet, about 6½ acres. The arrangement of such a field is shown on the diagram.



Plan for an Athletic Field.

This is a quarter mile track with one side prolonged for the 220 yards straightaway. The straight sides are 110 yards in length and 69 yards, 1 inch apart, measured from curb to curb. The sides are joined at either end by semicircles having a radius of 103 feet, 6½ inches from center to curb. This form of track is the best for running races. The track should be at least 12 feet wide; a width of 15 or 18 feet is preferable. If it is not practicable to make the whole track 18 feet wide, that breadth should be given to the straightaway.

The position of the baseball diamond, catcher's path, and backstop are shown in I and O. The diamond may be shifted a little in either direction, if found desirable. The letters M, N, S, and T indicate the positions of the 4 goal posts for football. The best way to arrange them is to sink 4 posts, a foot in diameter and 4 feet long, 2 inches below the surface of the field. These posts have in the upper ends holes a foot deep, into which the goal posts fit. When not in use remove the goal posts, put wooden plugs into the holes, and cover up the sunken posts, so as to leave the ground unobstructed. The inner field may also be used for soccer football and lacrosse by erecting goals which may be put up and removed easily. All that portion of the inner field, beginning at the end of the track opposite from the baseball backstop, and extending toward the baseball diamond, may be marked into lawn tennis courts. Other courts may be laid out in the corners of the field, not used for grand stand. The most convenient positions of the jumping and pole-vaulting runs and pits are indicated by the letters P, Q, and R. The circles for the shot and hammer are indicated by the letters J and L.

The grand stand should be located as shown at D, on the other side of the track from the finish line of all the races. The floor of the front row of seats on the stand should be at least 6 feet above the level of the track, in order that the view of the spectators may not be obstructed by persons walking in front of the stands. On the outer edge of the track, in front of the grand stand, there should be a single row of seats reserved exclusively for contestants, and officials not actively engaged in the contests then taking place. The space under the grand stand may be used for dressing rooms, bathrooms, lavatories, etc.

To lay out the track, first mark out by a row of small wooden pegs a straight line down the center of the field from one end to the other. On this line stick 2 large pegs, 540 feet 1 inch apart, making the position where it is desired to have the extreme points of the end of the track. From these 2 large pegs measure off 105 feet ½ inch toward the center, and mark the points by stakes. Then, with a wire 105 feet 5 inches in length held at one end against the stakes and having at the other a sharp spike, scratch out on the ground the semicircular ends; mark them out by rows of small pegs, which will be the straight sides. Then measure carefully around the course thus marked out by pegs, and, if it is found a few inches longer or shorter than a quarter mile, adjust some of the end pegs so as to make it exactly correct. Then mark out the line for the curb, 18 inches inside this measurement line, all round the field, and the track is laid out.

The curb should be of 2 × 9 inch wood, 3 inches above the path and 6 inches under ground, so as to be firm. This should be bent around the curves by sawing slits into its inner edges as frequently as necessary, thus making the line of the curb round and not a succession of straight edges. Holes should be bored through this curb every few feet, just at the surface of the path, so as to allow the water to run through into the inner field, and there should be, just inside of the curb, an open ditch or a 4-inch covered drain to receive the water. The track should have a slope from the outside to the inside, just enough so that the water will run off freely into the inner field. The lowest part of the track should not be less than 3 inches above the level of the inner field, so that in wet weather the path will drain freely and promptly. On the ends the track should be sloped up from the curb, about one quarter inch to the foot, so as to permit draining.

The proper construction of the track surface is of utmost importance. A good track is light and springy; it drains easily in wet weather and does not get dusty in dry weather. These results are most likely to be secured by building a track according to the following directions: —

1. Excavate the track surface to a depth of

9 inches below the final grade of the track, giving it a slope of 3 inches in 18 feet.

2. Spread a layer of broken stone 3 inches deep, and roll to an even surface.

3. Upon this, a layer of 3 inches of coarse cinders to be carefully spread and rolled in thin layers and thoroughly soaked while being rolled.

4. The final layer, or top-dressing, is to be laid in the same manner. It is to be 3 inches deep, and consists of a mixture of loam and cinders in the proportion of half loam and half cinders, both to be thoroughly mixed after sifting in most careful manner, using finest sieve. This layer is then carefully spread and rolled.

After a track has been built, constant attention is necessary to keep it up to a high standard of efficiency. It should be rolled every day and sprinkled as often as necessary to keep it smooth, firm, and free from dust. G. L. M.

ATKINSON, EDWARD PARSONS (1820–1890). — Educator and author, was graduated at Harvard in 1838. For 30 years he was engaged in public school work in Massachusetts, and from 1868 to 1889 he was professor of English in the Massachusetts Institute of Technology. He was one of the editors of the *Massachusetts Teacher* and the author of the following educational works: *Classical and Scientific Studies, Great Schools of England, History and the Study of History, Study of Politics.* W. S. M.

ATLANTA BAPTIST COLLEGE, ATLANTA, GA. — An institution for the education of negro young men, organized in 1867 in Augusta, Ga., as the Augusta Institute. The removal to Atlanta was made in 1879, and the present title was obtained in 1897. It is under the auspices of the American Baptist Home Mission Society. Preparatory, academic, college, and theological departments are maintained. The academy gives approximately 16 units of high school work. In the college the degree of B.A. is conferred on those who complete the course. More than half of those attending the institution are in the preparatory department, which comprises the five higher grades of the public school and equips pupils to enter the academy or to pass the state teachers' examination. There is a faculty of 10 professors and 7 instructors.

ATLANTA, CITY OF. — The capital and the largest city of Georgia. Organized as a city in 1874, and operating under special laws of the state of Georgia. In 1900 Atlanta had a population of 89,872, and in 1908 an estimated population of 109,545. Its school census, 6–18 years of age, was 25,490 in 1908, and its total day-school enrollment was 15,952 in 1910. 33 per cent of the total population in 1900 was of the colored race, and 2 per cent was foreign-born.

The school department is under the control of a Board of Education, composed of 10 members, consisting of 1 elected from each of 8 wards, and the Mayor of Atlanta and the Chairman of the Public School Committee of the City Council, *ex-officio.* The Superintendent of City Schools reports directly to the State School Commissioner, instead of through the County School Commissioner, and likewise the city draws its proportion of the state school fund direct.

The city maintains elementary schools for the two races, and 2 high schools for whites, 1 for boys and 1 for girls. It employed 429 teachers and 13 supervisory officers, and provided a term of 200 days in 1909–1910; 39 teachers were employed in high schools. Thirteen teachers were employed in evening schools, and a term of 200 evenings was provided. The total receipts for current expenses in 1907–1908 were $330,320. The city provides manual training in the elementary school and in the boys' high school.

Reference: —

Reports and Manuals Atlanta Public Schools, 1871–1910.

ATLANTA UNIVERSITY, ATLANTA, GA. — An institution for the higher education of negroes, incorporated in 1867 and opened in 1869. A high school course (college and normal preparatory) and college and normal courses are offered. The college entrance requirements are equivalent to about 2½ years' high school work. The majority of the students are in the high school. The normal work is done in 2 years. Degrees are given at the end of the 4 years' course. There are 5 professors, 5 instructors, and a number of assistants on the faculty. Rev. Edward T. Ware, A.B., is the president.

ATLANTIC CHRISTIAN COLLEGE, WILSON, N.C. — A coeducational institution, founded in 1902, as the state college of the Christian Church. Preparatory, collegiate, ministerial, commercial, and fine arts departments are provided. Admission is by certificate from an accredited high school or by examination requiring about 2½ years' high school work. Diplomas and degrees are conferred. The theological course may be completed in 3 years after graduation, or in 4 years after the freshman class. There is a faculty of 14 instructors. Jesse C. Caldwell, A.B., B.D., is the president.

ATLAS, SCHOOL. — See MAPS.

ATOMISM. — The philosophical theory of matter which endeavors to discover the nature of its constitution by resolving it into its simplest and indivisible elements. These are called atoms (ἄτομα). The theory (also known in modern times as "materialism") found its first formulation among several Greek thinkers (usually referred to as the Atomists) in the pre-Socratic group of Greek philosophers, chief among whom were Leucippus (*c.* 500 B.C.) and Democritus (460–370 B.C.). By the latter especially matter is regarded as divisible into an infinite number of infinitely little particles or molecules which unite and separate. These particles possess the same intrinsic quality, differ in form, size, and relative position, and are in ceaseless motion. This motion is originally their own; and the changes which happen in the world are caused by them according to necessity, and not according to any end or design. The soul and all its activities, including knowledge, are also explained by means of atoms, although finer and smoother ones are postulated for this purpose.

In one form or another, atomism as a philosophical doctrine or a scientific theory has continued down to the present day. Among the philosophers it has received acceptance as a theory of all things, or modification as a theory of matter only, by Epicurus, Lucretius, Scotus Erigena, Cusanus, Descartes (corpuscles), Hobbes, Leibnitz (immaterial monads), Lamettrie, Holbach, Kant, Fechner, and others. In more recent times the atomic theory has been particularly suggestive for the development of hypotheses by the physical sciences. Their rapid development, especially as relates to the explanation of phenomena in physics, chemistry, and physical chemistry, has advanced largely in terms of an atomistic theory. Two instances illustrate the scientific services of modern atomism; namely, the molecular theory of gases, and the important theory of atomic weights. Each atom in a given chemical element has the same form and weight. But the different elements now known to chemistry are regarded as having atoms of different weights, which are estimated in terms of the ratios in which they, respectively, unite with hydrogen, the latter being taken arbitrarily as one. The more recent theory of vortex atoms has given place to the electric theory of matter, which holds that the primitive constituent of the atom is the electron.

For the most part, atomism (or materialism) as a philosophical theory has, oddly enough, not formulated a definite, positive theory of education. Its contribution to the solution of both the theoretical and the practical problems of education is negligible. The chief historical instance where a materialistic psychology and philosophy came nearest to exerting a molding influence upon educational theory may be found in French thought preceding the French Revolution. The logical bearing of this theory upon education is to eliminate the more human values and to require a complete reduction of formal schooling and incidental education to the status of a mechanical process. E. F. B.

References: —

LANGE. *History of Materialism.* Eng. tr. 1892.
LASSWITZ. *Geschichte der Atomistik vom Mittelalter bis Newton.* 2 vols, 1890.
MABILLEAU. *Histoire de la philosophie atomistique,* 1895.

ATROPHY. — When any organ is not used it tends to become weaker, and in many cases shrinks in size. This reduction of an organ to inactivity is known as a process of atrophy. The term "atrophy" is used figuratively with reference to mental functions, these functions being said to atrophy through lack of exercise. The lack of exercise necessary for the proper development of an organ or function may be due to a variety of causes. In some cases atrophy of functions is due to neglect, in other cases to pathological conditions which interfere with proper nutrition or circulation.

ATTENDANCE. — The school attendance of a child is recorded in terms of presence and punctuality. Reports upon a child's attendance are usually made to the parents by indicating the number of times of tardiness and the number of days or half days of absence. Averages of school attendance in school reports are calculated from the record of presence or absence, tardiness usually being disregarded in the measure of attendance. The measures of attendance used to indicate the attendance of a given school vary with different localities, those in most common use being the following: (1) Total enrollment or register of the entire number of names recorded in the various registers; (2) Net enrollment, the total enrollment minus duplicate enrollments due to the transfer of children from grade to grade or to readmissions; (3) average enrollment, or average number belonging, a variously calculated measure which attempts to express the average enrollments for the period covered by the measure; and (4) average daily attendance, commonly found by dividing the total number of days of attendance by the total number of days taught. The last-named measure is most frequently used. It is frequently the case that school moneys are distributed to schools upon the basis of some measure of attendance.

The problem of maintaining punctual and persistent attendance is important in school management, particularly in districts where parents are lax in the control of their children. Irregular attendance interferes greatly with the efficiency and economy of school effort. Every child who returns to school after an absence holds back the progress of his class, or becomes an increased burden because of his need for more or less individual attention from the teacher. In consequence, teachers expend considerable effort in the maintenance of attendance. The child is held to account for his absences and tardinesses, and a written excuse from his parents is required. If illness in the household or matters of important family business have detained the child, then the excuse is accepted. If such an excuse is not provided, the child's delinquency is treated as an infraction of the rules of the school, and punished with reprimands, detention, loss of privileges, etc. Sometimes the standing in attendance is permitted to affect the standing in scholarship, and consequently the promotion of the pupil; such a treatment of absence is generally regarded as unjustifiable in present-day practice. It frequently occurs that the teacher, under pressure from a superior officer or under the stress of interclass or interschool competition, may make absence and tardiness seem greater offenses than they are, and thus impel children to a morbid fear of staying out of school, even when illness or some other course justifies the same. Under normal circumstances there will always be some absence, the acceptable average daily attendance being variable. Roughly speaking, the attendance should not be allowed to fall below an average daily attendance of about 90 per cent. The attempt of a teacher to maintain it above about 98 per cent may not justify the effort expended and the discomfort caused to the legitimate absentees.

The problem of reducing unpunctuality or tardiness is similar to that of eliminating unnecessary absences. An interesting school life increases school attendance, as interesting morning exercises or assemblies reduces tardiness. It occurs now and then that teachers make children feel the disgrace of tardiness so keenly that they prefer to absent themselves from school a half day to being late. Such an emphasis is obviously unwarranted.

Many devices are used to stimulate proper attendance. Among these are the ringing of a warning bell prior to the final bell of assembly, competition between classes and schools, demerit marks, honor rolls, the posting of names, later excusal from school attendance, etc. When persistent absences occur among children of compulsory school age, the aid of the attendance or truancy officer is invoked.

H. S.

See ATTENDANCE, COMPULSORY.

References: —

BAGLEY. *School Management,* Chap. V.
SEELEY. *New School Achievement,* Chap. V.

ATTENDANCE, COMPULSORY. — The State acts toward education in a threefold way: it may support education; it may control and manage it; and it may enforce it on given communities or individuals. Any one or more of these functions it may leave to private initiative. But the nineteenth century has witnessed state activity on a large scale along all three lines, with reference to that stage of education commonly called elementary. The right of society (acting through the State) to compel a certain amount of attendance at school has long been unquestioned; and in recent years it has become customary to insist also on a minimum standard of educational proficiency being realized as a condition for leaving school.

Compulsory education has become closely identified with a number of other phases of social economy, such as restriction of labor for young children, industries prohibited on account of danger to life and health or morals, administration of relief, and the education of defectives. In America the recent activity in legislation relating to compulsory education has not come so much from educators as from the leading voluntary movements for the physical, moral, and intellectual welfare of children. These movements have sought the fuller protection of childhood in general, and compulsory education has been but one of the main features.

Germany. — *Historical.* — The notion of education made compulsory by the State had its origin in Germany. The Reformation (*q.v.*), as voiced by Luther and others, stood, among other things, for universal education supported and controlled by the State. Luther also clearly perceived the logical necessity of compelling negligent or selfish parents to procure education for their children, and the obligation of communities to assist needy parents in this respect. "It becomes councilmen and magistrates to watch over youth with unremitting care and diligence." Universal education along the line of vernacular studies followed gradually after the Reformation, and within 200 years of Luther's period the principle of compulsory education was being put in practice. As early as 1619 school attendance was made compulsory in Weimar for all children from 6 to 12, while in 1642 the same principle was adopted in Gotha. In 1773 compulsory attendance was made effective in Saxony, the ages embraced being from the fifth to the fourteenth year.

As early as 1713 King Frederick William perceived with dissatisfaction that "parents, especially in the country, prove negligent in sending their children to school, in consequence of which negligence the poor youth are kept in gross ignorance as concerns reading, writing, and ciphering, as well as that which concerns the weal and salvation of their souls." In 1717 the King issued the first law of compulsory attendance for Prussia. It orders that "hereafter wherever there are schools in the place the parents shall be obliged, under severe penalties, to send their children to school." "School is to be attended daily in winter, but in summer at least twice a week." "In cases where parents have not the means to pay so much, the fee is to be paid from the community's funds." In 1763 appeared the *General Country School Regulations,* which united the various existing ordinances relating to compulsory attendance. They provided for the ages of compulsory schooling, the fees that might be charged, penalties to be imposed on negligent parents, and the obligation of communities to educate children of destitute parents. These regulations, elaborated under Frederick the Great, were slightly bettered from time to time, but they made from the outset a comprehensive system of school control. In many respects they have required no change to this day. Of course it must not be understood that this desirable legislation was everywhere equally enforced. Local authorities often ignored it; and there was a period when even the minister of State (Woellner in 1794) undertook distinctly reactionary measures. But all subsequent rulers who sought the well-being of the people favored and usually procured compliance with compulsory education legislation. In passing, it may be noted that the *General Code* of 1794 contained one provision which in modern times comes to be a final step in compulsory education: " the instruction in school must be continued until the child is found to possess the knowledge necessary to every rational being."

Subsequent steps in the development of compulsory education in Prussia are mainly matters of detail. In 1888 fees were abolished. The extension of Prussian authority over acquired provinces introduced many difficulties, which resulted in bringing all types of education more or less directly under the state authorities, and state aid was provided to needy communities. In 1890 all compulsory education legislation was unified, and by a series of devices responsibility was entailed on parents, employers, and communities to a degree which makes evasion of this obligation impossible in the case of persons of settled habitation, and almost impossible in case of shifting peoples, like canal boatmen, etc.

Present System. — Compulsory education in Germany has now the following marked features: Except in case of some defectives, all children must complete the elementary (*Volkschule*) course of study or attend until 14. After this they must continue in school unless regularly employed; and in most parts of the empire those employed must until they reach 17 or 18 make a minimum of attendance at continuation school, an amount which may be stated in terms of hours per week or hours per year and ranges from 2 to 4 hours per week.

See CONTINUATION SCHOOLS, and GERMANY, EDUCATION IN.

Formerly this compulsory attendance was made in Sunday or evening schools; but opposition among physicians developed toward compulsory evening school attendance for children of 14 to 17 years of age, and the tendency of recent legislation has been to require that employers should release their apprentices for sufficient day hours per week to meet the requirements of compulsory attendance. For apprentices in some fields continuation attendance is obligatory until 17, in others until 18. When it is recalled that the typical German must at 19 or 20 begin 2 or more years of compulsory service in the army, which is in effect a school, it is evident that the period of compulsory education for the German youth is a long one.

France. — Prior to the Revolution the question of compulsory education was mostly an academic one. The application of compulsion was opposed on the grounds of human liberty by writers like Talleyrand, who yet argued in favor of free education in the essentials of knowledge.

The National Convention in 1792 created a committee on public instruction which among other topics debated the principle of compulsion, usually in the direction of favoring it. The so-called *loi Bouquien* made attendance for at least 3 years obligatory. But under the Napoleonic régime the compulsory principle was not asserted. For 30 years no further progress appears. The law of 1833 did not compel attendance, but paved the way for it, since it was made obligatory on the communes to provide and enforce education. In 1848 Carnot proposed a more comprehensive law, but all the time the question was involved with that of free education. In 1871 Simon's projected law asserted the necessity of requiring each child from 6 to 13 to attend school, and imposed penalties on parents who employed children during this period. Local committees (*commissions scolaires*) were to enforce this attendance. These committees were also to hold examinations of children educated privately or by religious bodies, and then would be able to send the child to another school in case he exhibited imperfect results in examination.

But not until 1882 were laws finally enacted that expressed the principle comprehensively. The famous law of March 28, 1882, made primary education compulsory and religious education optional. Education could be given anywhere, but a local committee must oversee its results. A variety of detailed measures was aimed to secure its enforcement. (Dreyfus-Brissac, *L'enseignement obligatoire*, in *Recueil des Monographies Pédagogiques.*)

In practice the above law was good except as regards the testing of private education. Local examination by *commissions scolaires* was quite unworkable. But as regards some kinds of school attendance the law is along right lines. The local authority (mayor) makes out a list of all children in the commune. Absences must be notified to the mayor by the parents.

The weakness of the law at present consists in the early age (11) at which a child may take examinations for the primary certificate, on obtaining which he may take employment. The brightest children, therefore, can be earliest forced into labor by unscrupulous parents.

England. — The early efforts for the protection of children lay along humanitarian lines. The factory system made legislation to protect children from premature or overwork necessary, but for two reasons compulsory education received little attention until after 1870. The first was the individualistic character of Englishmen. "My impression is that such an Act (subjecting to imprisonment any parent who did not send his child to school), if passed and attempted to be carried out, would produce a national commotion not much less dangerous than that which attended a poll tax," declared Mr. Bellairs, an experienced inspector, in 1864. The second was that the administration of education was still a private or philanthropic affair, and the State was not able to enforce attendances.

But in 1870 and 1873 the establishment of board schools carried also the principle of compulsion, at first in the shape of powers given to local boards. A more complete act in 1876 laid down a variety of detailed measures for enforcement. Parents or guardians of children from 5 to 14 (originally 5 to 13) were put under obligations to send them to a certified school every day that such school is in session. In case children are sent to an uncertified (inspected and approved) school, the burden rests on the parent to prove the competency of the school. Five to 13 is still admitted as the compulsory age in certain rural districts.

A considerable list of exemptions, however, existed. At 12 children could be examined, and if found proficient could be excused from further attendance. A system of part-time attendance could also be permitted by local authorities, that is, for children from 12 to 14 (11 to 14 in agricultural areas) if they had attained a certain standard of proficiency or made during 5 previous years a required number of attendances. As modified by special provisions, the English law is exceedingly complex, and local authorities have considerable latitude in its enforcement. The principle of compulsion has always been resisted there, as in the United States. Local authorities have not always been zealous in executing the laws, and their enforcement has been due largely to the authorities engaged in carrying into effect factory legislation.

In 1908 the passage of the Children's Act codified a variety of legislation relating to children, and opened the way for more comprehensive reform measures which are now in process of discussion. The abolition of the half-time system and the development of compulsory continuation school attendance (already legalized in Scotland) are foreshadowed.

United States. — *Historical.* — Compulsory education in the United States occurred first in Massachusetts. As far back as 1642 the selectmen were enjoined to compel parents to teach their children themselves or to procure that teaching for them. But the need of compulsory education is not keenly felt in an agricultural population, especially if it is homogeneous, and if newly arrived foreigners are not numerous. Not till the approach of the middle of the nineteenth century did Massachusetts realize the need of enforced attendance. This was one of the matters to which the State Board of Education, created in 1837, gave its attention. In 1842 a child labor law was passed; in 1852 the first law on compulsory attendance appeared. It required of each child from 8 to 14 years of age at least 12 weeks of attendance each year, of which 6 should be consecutive. A fair penalty was imposed, but parents able to prove poverty or inability could be excused. The law seems to have had little force and to have claimed little attention. Many of the absentees were children whose parents had lost control of them, so the authorities turned their attention to dealing with truants.

Recognizing the unsatisfactory condition of existing laws, the State Board recommended a new law in 1872. This was passed next year. It reduced the period of compulsory attendance 2 years (but this was again raised to 14 next year), but extended the time each year from 12 to 20 weeks. Town officials were subject to a penalty if they refused to enforce the law. It was also made obligatory upon towns to provide a place for the confinement of truants. Truant officers were made a part of the school system, receiving their appointments from the school committee. In 1875 Superintendent Philbrick gave expression to the need of a registry of children subject to the law, thus giving rise to the school census system of Massachusetts. In 1876 a fairly satisfactory child labor law passed the legislature; and in 1878 it was provided that state grants could be withheld from towns failing to carry out truancy legislation.

Like much subsequent legislation in other states, these early laws set good standards, but were irregularly and intermittently enforced. This matter was made the subject of a detailed inquiry by the secretary of the State Board in 1886. He found a variety of deficiencies in the enforcement of the law. This agent, Mr. George H. Martin, made a number of recommendations, some of which have appeared in subsequent legislation. Most important were the recommendations that the burden of proof in the case of absence should fall on the parent, that attendance should be compulsory during the entire time school is in session, that the State should provide clothing and books of children of indigent parents, and that the cost of educating truants should fall on a larger area than the town — preferably the county or state. He also advised the creation of the office of state agent to look after truancy, as in Connecticut, but this has not been adopted. In 1889 comprehensive legislation was again adopted in the matters of child labor and compulsory attendance. The most novel provisions of this legislation are found in the provisions which give school committees the authority to approve private schools, attendance at which is considered equivalent to that at public schools, prohibits the employment of children during hours of school session, requires the presentation of a certificate issued by the school authorities in the case of the employment of children under 16, and in effect imposes an educational qualification. The new law seems to have worked well, but many areas had insufficient accommodations for truants, and there it naturally failed in some degree.

The early history of compulsory school legislation in Connecticut seems to have been similar to that of Massachusetts. The law expressed an ideal, but many obstacles interfered with its enforcement. In the examination of these laws made in 1890 (*Rept. Com. Ed.* for 1888–1889, pp. 470–526) the statement occurs again and again that the law is "practically a dead letter." The chief obstacles were: the indifference of local public opinion; the unwillingness of local police or other officials to enforce the law against individuals, especially those who needed the assistance that came from the labor of children; the lack of school accommodations, especially for truant children; the lack of correspondence between the period of compulsory attendance and the total session of the schools which always provoked irregularity and lack of regard for the law; and the poverty of parents. In its legislation of 1872 Connecticut took the heroic step of putting the enforcement of child labor laws and compulsory education laws in the hands of state agents, a measure which has probably given that state the most effectively enforced system yet devised. The law refused also to recognize poverty of parents as a bar, thus removing one of the commonest grounds of evasion.

The following list shows the dates at which the several states enacted compulsory education legislation (from *Rept. Com. Ed.* 1888–1889, p. 471): Massachusetts, 1852; District of Columbia, 1864; Vermont, 1867; New Hampshire, Michigan, Washington, 1871; Connecticut and New Mexico, 1872; Nevada, 1873; New York, Kansas, California, 1874; Maine, New Jersey, 1875; Wyoming, 1876; Ohio, 1877; Wisconsin, 1879; Rhode Island, Illinois, Dakota, Montana, 1883. Between 1885 and 1890 Minnesota, Nebraska, Idaho, Colorado, Oregon, and Utah made laws on the subject.

It is true that previous legislation had sometimes the effect of requiring school attendance. In the seventeenth century Connecticut imitated Massachusetts in penalizing selectmen, if they did not compel parents to educate their children. The same state in 1813 required the proprietors of manufacturing establishments to see that the children in their employ could read, write, and cipher; and in 1842 the employment of children under 15 was prohibited unless they had been instructed for 3 months in the preceding year. As far back as 1850 towns in Maine were authorized to make laws against truancy, but nothing appears to have been done.

In 1890, 27 states and the District of Columbia had laws on compulsory education. This embraced all except the Southern states, which had not begun to legislate on the subject. In all of these except Wisconsin, which put 13 as the minimum age, 14 or more was the minimum age of exemption from school attendance; but in Maine, Rhode Island, and Washington the minimum age was 15, and in Connecticut, Minnesota, and Wyoming the minimum age was 16. More important was the amount of attendance to be made each year, since, if the compulsory attendance is considerably less than the full term, the practical difficulties in the way of enforcing the law are multiplied. In 17 states an attendance of 12 weeks was prescribed; in 4, 16; and in 4, 20. Only one state — Connecticut — required attendance as long as the schools were in session, while Massachusetts, in effect, obtained the same thing in cities.

In all states except New Jersey it was reported that school officers and their truant officers were charged with enforcement of the law. There was no centralized control except in Connecticut. In New Jersey police officers and constables were required to carry out the law. Penalties inflicted on parents were almost uniformly fines ranging from $1 to $20, with augmentation for repeated offense. Very few states had truant schools, though in some cases youths could be committed to reform schools.

Only 10 states report a minimum age — ranging from 10 to 13 — below which employment during school hours is prohibited. In 13 states a certain amount of school attendance — from 1 to 5 years — is made a prerequisite of employment, while as yet there was no reference to definite educational qualifications which must be attained. Twelve states take some notice of the kind of instruction which must be given in private schools, if this is to be accepted in lieu of attendance at public schools, but these requirements were meager and probably unenforcible. Only Ohio makes attendance compulsory beyond the minimum age — from 14 to 16 — in case of children not employed.

In 8 or more states local authorities were authorized to provide free books for children of indigent or poor parents; but as many other states provided free books for all pupils, this comparison is not of much value. But, very significantly, 2 states — Ohio and Colorado — enable local authorities to provide free clothing, thus coming definitely into the field in aid of children whose parents feel too poor to send them to school.

Present System. — By 1908 almost all the states had enacted legislation on the subject. The following table taken from the *Rept. Com. Ed.* 1908, Vol. I, shows in detail the situation.

STATUTORY PROVISIONS RELATING TO COMPULSORY ATTENDANCE AND CHILD LABOR

COMPULSORY EDUCATION				CHILD LABOR	
State	*Age*	*Annual period*	*Penalty on parents for neglect*	*Age under which specified employments are forbidden*	*Educational restrictions on child labor*
Alabama				10 years, in factories in all cases; 12, unless orphans, or children of the widowed or disabled; 12, in mines.	
Arizona	8–14[1]	6 months; 20 weeks consecutive.	$5 to $25		No child under 14 may be employed during school hours.
Arkansas				12 years, in all cases in manufacturing establishments, except canning industries in vacation; 14, unless to support a parent or self, as specified by law; 14, in mines; females not at all in mines.	No child 14 to 18, unable to write, may be employed in a manufacturing establishment, unless he has attended school 12 weeks the preceding year.
California	8–14	Full term	First, not over $10 or 5 days' imprisonment; subsequent, $10 to $50, or 5 to 25 days, or both.	14 years, in any mercantile or manufacturing establishment, workshop, hotel, or as messenger, etc. Children 12 to 14, upon permit, may work if parents incapacitated, or during vacation.	No minor under 16 may work for gain in school hours, unless he can read and write English or attends night school.
Colorado	8–16[2]	Full term	$5 to $25	14 years, in any underground works, mine, smelter, mill, or factory. No female may be employed in a coal mine.	Unlawful to employ children under 14 during school hours unless they have complied with the school-attendance law; under 16, unable to read and write, unless attending day or night school.
Connecticut	7–16[3]	Full term	Not exceeding $5 each week of absence.	14 years, in any mechanical, mercantile, or manufacturing establishment.	Children under 14 may not be employed while school is in session. Children 14 to 16 cannot leave school to be employed, unless their education is satisfactory to the local or state school board.
Delaware	7–14	5 months (may be reduced by districts to 3).	First, not over $2; after, not over $5. On default, imprisonment 2 to 5 days.	14 years, in any factory, workshop, or manufacturing establishment, except in canning industry, etc., or to support widowed mother.	No child 14 to 16 may be so employed, unless he has attended day or night school 12 weeks the preceding year.
District of Columbia	8–14	Full term	Not exceeding $20	14 years, in any factory, workshop, store, office, hotel, theater, as messenger, etc. Children 12 to 14 may get permit to work in certain cases.	Children under 14 may not do any work for wages during school hours; nor under 16 in preceding employments, unless they can read and write, and attended school 130 days preceding year.
Florida				Children under 15 may not be employed more than 60 days without consent of legal guardian.	
Georgia				10 years, in or about any manufacturing establishment; 12 years after Jan. 1, 1907, except for support of self or parents in specified cases.	After Jan. 1, 1908, no child under 14 may be employed as in preceding column (with the exception there noted) unless able to write and has attended school 12 weeks the preceding year; under 18, unless so attended school.
Idaho	8–16[4]	Full term	Not over $300 or imprisonment not over 6 months, or both.	14 years, in any mine, factory, workshop, mercantile establishment, laundry, hotel, etc., except over 12 during vacations.	No child under 14 may be employed in any way during school hours.
Illinois	7–16[3]	Full term, to be not less than 110 days of actual teaching.	$5 to $20 and costs, stand committed until paid. Penalty for false statements as to age or attendance, $3 to $20.	14 years, in any mercantile institution, factory, office, theater, elevator, etc., or as messenger or driver; 16, in or about any mine. No female may work in or about a mine.	No child 14 to 16 unable to read and write may be employed unless attending an evening school, if there is one. No child under 14 may be employed at any work for wages during the school term.
Indiana	7–14[5]	Full term	$5 to $25, and, in discretion of court, imprisonment 2 to 90 days.	14 years, in any manufacturing or mercantile establishment, mine, quarry, laundry, renovating works, bakery, or printing office. No female may work in a mine.	Children under 16 unable to read and write English may not be employed in foregoing employments except in vacation of public schools.

STATUTORY PROVISIONS RELATING TO COMPULSORY ATTENDANCE AND CHILD LABOR—*Continued*

COMPULSORY EDUCATION				CHILD LABOR	
State	*Age*	*Annual Period*	*Penalty on parents for neglect*	*Age under which specified employments are forbidden*	*Educational restrictions on child labor*
Iowa..........	7–14	16 consecutive weeks.	$3 to $20...........	14 years, in any mine, factory, mill, shop, laundry, packing house, elevator, or store where more than 8 persons are employed.	
Kansas........	8–15[5]	Full term[6]..........	$5 to $25..........	14 years, in any factory or packing house or in or about any mine; 16, in any dangerous, etc., employment.	No minor under 16 may work in a coal mine unless he can read and write and has attended school 3 months in the year.
Kentucky.....	7–14	8 consecutive weeks; full term in cities of first, second, third, and fourth classes.	First, $5 to $20; subsequent, $10 to $50.	14 years, in any mine, workshop, factory, store, office, hotel, as messenger, etc.	Under 14 may not be employed in any way during school term; nor from 14 to 16 in stated occupations unless he can read and write, and attended school 100 days preceding year.
Louisiana.....	.....	....	....	14 years, in any manufacturing or mercantile establishment, mine, laundry, carrying messages, etc.	Children under 14 may not be employed in foregoing employments, nor in clothing, dressmaking, or millinery establishments, unless they have attended school 4 months in preceding year.
Maine.........	7–15	Full term...........	Not exceeding $25, or imprisonment not exceeding 30 days.	14 years, in any manufacturing or mechanical establishment.	Children under 15 shall not be employed in any manufacturing or mechanical establishment, except during vacation, unless they have attended school 16 weeks during preceding year.
Maryland[7] ...	8–12[3]	Full term...........	Not exceeding $5....	14 years, in mills and factories (except canning establishments), unless self, widowed mother, or invalid father solely dependent upon such employment. 19 counties exempt from law.	No minor 12 to 16, unable to read and write English, may be employed where there is an evening school, unless attending that or another school.
Massachusetts.	7–14[3]	Full term...........	Not exceeding $20...	14 years, in factories, workshops, or mercantile establishments.	Children under 14 may not be employed at any work for wages during school hours; from 14 to 16 may not be so employed in any factory, workshop, or mercantile establishment if unable to read and write.[8]
Michigan......	7–16	Full term...........	Fine of $5 to $50, or imprisonment 2 to 90 days, or both.	14 years, in any manufacturing or mercantile establishment, workshop, laundry, store, office, hotel, messenger service, etc.	Children 14 to 16 unable to read and write English may not be employed.
Minnesota.....	8–16	Full term...........	Not over $50, or imprisonment not over 30 days.	14 years, in factories, mills, workshops, or mines.	Children under 14 years may not be employed in any service during school term; under school age (16 years), in any occupation during school term unless they have attended school the prescribed period; under 16, unable to read and write English, in any indoor occupation (except in vacation) unless attending day or evening school.
Mississippi....	.....	....	....	12 years, in any mill, factory, or manufacturing establishment.	
Missouri	8–14[9]	Not less than ½ of term. Full term in cities of over 500,000.	$10 to $25, or imprisonment 2 to 10 days, or both.	14 years, in any mine, manufacturing or mercantile establishment, laundry, etc., in cities of over 10,000; no females in mines.	No child 8 to 14 may be employed in any way in school hours unless he has complied with the attendance law. No boy under 16 may work in a mine unless he can read and write.
Montana[3].....	8–14[3]	Full term; in no case less than 16 weeks.	$5 to $20...........	16 years, in mines or underground works.	Children under 14 not to be employed during school sessions unless they have completed the studies required by law; from 14 to 16, if unable to read and write English.

STATUTORY PROVISIONS RELATING TO COMPULSORY ATTENDANCE AND CHILD LABOR—*Continued*

Compulsory Education				Child Labor	
State	*Age*	*Annual Period*	*Penalty on parents for neglect*	*Acts under which specified employments are forbidden*	*Educational restrictions on child labor*
Nebraska[10]	7–15	Two thirds of school term; in no case less than 12 weeks. Full term in cities, hotel, etc.	$5 to $25 (on truant officer)	14 years, in any manufacfacturing or mercantile establishment, office, hotel, etc.	No child under 14 may be employed in any service during school hours.
Nevada	8–14	16 weeks; 8 consecutive.	First, $50 to $100; subsequent, $100 to $200; with costs.	....	
New Hampshire[11]	7–14	8 Full term	First, $10; subsequent, $20.	12 years, in any manufacturing establishment.	No child under 14 may be employed during school sessions, nor under 16 if unable to read and write English. No minor unable to read and write English may be employed unless attending day or evening school, if any is held.
New Jersey	7–17[12]	Full term	"Punishable as a disorderly person."	14 years, in factories, workshops, mills, or manufacturing establishments; also mines.	Children under 15 must have attended school 12 weeks the preceding year as a condition of employment.
New Mexico	7–14	3 months	$5 to $25, or imprisonment not exceeding 10 days.	....	
New York	8–16[3]	Full term (Oct. 1 to June 1).	First, not exceeding $5; subsequent, not exceeding $50, or imprisonment not exceeding 30 days, or both fine and imprisonment.	14 years, in factories; if 14 to 16, the child must have attended school 130 days the preceding year, and be able to read and write English, and cipher. Similar provisions apply, in places of over 3000 population, to work in mercantile establishments, business offices, restaurants, hotels, express or messenger service, except for children over 12 in small places during vacation. For work in or about mines 16 years is the minimum. No female may work in a mine.	Unlawful to employ in any business or service child under 14 during school term; 14 to 16, unless he has attended 130 days preceding year, and can read and write English, and cipher, or (in first and second class cities) has completed elementary course or attends evening school 16 weeks a year. See preceding column.
North Carolina	8–14[13]	16 weeks	$5 to $25	12 years in any factory or manufacturing establishment (does not apply to oyster canning and packing); 12 years, in mines employing over 10 men (boys); children 12 to 13 may be employed in factories only as apprentices.	Apprentices, 12 to 13 years, must have attended school 4 months in preceding 12.
North Dakota	8–14	Full term	$5 to $20 (on school official).	12 years, in mines, factories, and workshops (constitution of State).	Children under 14 may not be employed in any manner during school hours unless they have attended school 12 weeks during the year.
Ohio	8–14[11]	Full term; in no case less than 24 weeks.	$5 to $20; on default, imprisonment from 10 to 30 days.	14 years, in any factory, workshop, business office, mercantile establishment, hotel, as messenger, etc.	No child between 14 and 16 may be employed in foregoing occupations without a schooling certificate.
Oklahoma	8–16	3 to 6 months[14]	$10 to $50	16 years, in mines (no girls in mines).	
Oregon	9–14[3]	and [5] Full term	$5 to $25 fine, or imprisonment 2 to 10 days, or both.	14 years, in any factory, store, workshop, in or about any mine, or in the telegraph, telephone, or public messenger service.	Foregoing employments forbidden to any child 14 to 16 unless he attended school 160 days preceding year and can read English. No child under 14 may be employed in any work for compensation during school hours.
Pennsylvania	8–16[15]	Full term; but the school board of each district has power to reduce this to not less than 70 per cent of the term.	First, not exceeding $2; subsequent, not exceeding $5; on default, imprisonment; first, not over 2 days; subsequent, not over 5.	14 years, in any employment, except domestic, coal mining, or farm labor; 16 years in coal mines; 14 years in or about the outside workings of coal mines. Girls may not work in or about coal mines.	No child 14 to 16 may be employed unless he can read and write English and has complied with the school laws.
Rhode Island	7–15[16]	Full term	Not exceeding $20	13 years before, 14 after Dec. 31, 1906, in any factory, manufacturing or business establishment.	Children under 13 may not be employed except during school vacations.

STATUTORY PROVISIONS RELATING TO COMPULSORY ATTENDANCE AND CHILD LABOR—*Continued*

Compulsory Education				Child Labor	
State	*Age*	*Annual Period*	*Penalty on parents for neglect*	*Acts under which specified employments are forbidden*	*Educational restrictions on child labor*
South Carolina	.....	....	....	10 years after May 1, 1903; 11 after May 1, 1904; 12 after May 1, 1905, in any factory, mine, or textile establishment, except that certain self-dependent children may work in the latter.	Children may work in textile establishments in June, July, and August if they have attended school 4 months during the year and can read and write.
South Dakota	8–14[3]	Full term; but districts may reduce it to 16 weeks, 12 consecutive.	$10 to $20 and costs; stand committed till paid.	14 years, in mines.........	No child 8 to 14 to be employed during school hours unless he has attended school 12 weeks during the year.
Tennessee	(17)	....	....	14 years, in workshops, factories, or mines.	
Texas	.....	....	....	12 years, in mills, factories, manufacturing or other establishments using machinery; 16 years in mines, distilleries, or breweries.	Unlawful to employ children 12 to 14 who cannot read and write English, in mills, factories, etc., certain self-dependent children excepted.
Utah	8–16	20 weeks, 10 consecutive; in cities of the 1st and 2d class 30 weeks, 10 consecutive.	First, not exceeding $10; subsequent, not exceeding $30, with costs.	14 years, in mines (constitution of State).	
Vermont	8–15[18]	Full term	$5 to $25...........	12 years, for any railroad company or in any mill, factory, quarry, or workshop, or carrying messages.	No child under 16 who has not completed the 9-year school course may be employed in any railroad, factory, mine, or quarry work, or in delivering messages, except out of school hours.
Virginia[19]	8–12	12 weeks...........	First, $2 to $10; subsequent, $5 to $20.	13 years, after March 1, 1909; 14 after March 1, 1910, in any factory, workshop, mercantile establishment, or mine, except in certain cases of need over 12.	
Washington	8–15	Full term...........	Not over $25........	14 years, in mines (boys); 12 (boys), in the outside workings of a colliery; 14, in any factory, mill, workshop, or store, except (12 to 14) in specified cases of need.	Children under 15 may not be employed while the schools are in session, unless excused by the school superintendent.
West Virginia	8–14	20 weeks............	First, $2; subsequent, $5.	12 years, in factories, workshops, mercantile or manufacturing establishment; 14 in mines (no girls may work in mines).	No child under 14 shall be so employed during school term if it hinders regular attendance.
Wisconsin	7–14[3]	Full term in 1st class cities; in 2d class cities not less than 8, elsewhere not less than 6 school months.	$5 to $50 and costs, or imprisonment not over 3 months, or both.	12 years, in any occupation; 14, in factories, workshops, mines; 14 to 16, in any occupation without specified written permit.	Children 12 to 14 may not be employed in any occupation, except during school vacations by specified written permit, in stores, offices, hotels, mercantile establishments, laundries, or public messenger service, where they reside (does not apply to farming or other outdoor work).
Wyoming	7–14	6 months...........	Not exceeding $25....	14 years, in mines; females may not work in mines. (Constitution.)	
United States laws (for territories).	.....	....	....	12 years, in the underground workings of any mine.	

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[1] To 16, if unable to read and write English.

[2] Children 14 to 16 whose labor is necessary to their own or parents' support are excused.

[3] Not applicable to children over 14 lawfully employed to labor at home or elsewhere.

[4] Except children over 14 who have completed eighth grade, or have to support selves or parents.

[5] Inclusive.

[6] 8 weeks for children over 14 who can read and write English and are at work to support themselves or others.

[7] The provisions tabulated for Maryland (except in fifth column) are those of the act of 1902, whose operation is limited to Baltimore City and Allegheny County.

[8] Must be able to so read and write as is required to enter the second grade in 1906, third in 1907, and fourth in 1908 and after.

[9] To 16 years in cities of over 500,000 for children not lawfully and usefully employed 6 hours a day.

[10] To 16 years in cities.

[11] To 16 if unable to read and write English.

[12] Does not apply to children over 15 who have finished grammar school course and are regularly employed; otherwise must attend grammar, or high, or manual training school.

[13] Law does not take effect in any county until voted by the county; does not apply to 11 counties, nor to children over 12 lawfully employed at home or elsewhere.

[14] In the discretion of school boards.

[15] Not applicable to children over 13 who can read and write English and are regularly employed in useful service.

[16] Not applicable to children over 13 who are lawfully employed.

[17] A compulsory attendance act was passed in 1905 applying only to Claiborne and Union counties; one for Campbell and Scott counties in 1907.

[18] Children over 15 or under 8, when once enrolled, must attend the full term they are enrolled for.

[19] Compulsory attendance law optional with the voters of any county, city or town.

Enforcement of the Law. — Contemporary attendance legislation involves the following chief factors: (*a*) A minimum age of universal attendance; (*b*) a minimum age unless certain educational requirements have been met; (*c*) the obligation of attendance beyond the minimum age if child is not regularly employed; (*d*) amount of attendance each year made obligatory, and its distribution within the school year; (*e*) special requirements and exemptions, and (*f*) machinery of enforcement.

(*a*) Throughout almost the entire United States some school attendance is compulsory from 7 or 8 years of age to 14. Alabama, Georgia, Florida, South Carolina, Texas, and Viriginia have not legislated on the subject (1909); and in North Carolina and Tennessee legislation so far passed is applicable only to special sections. (*b*) Massachusetts, New York, Idaho, New Hampshire, and others require certain educational qualifications, otherwise attendance is compulsory to 16. The (1908) law of New Jersey sets an upper limit of 17 for all who have not completed the eight grades; those finishing the elementary school course may not leave until 15. (*c*) A number of states require, especially in cities, that children under 16 must attend school regularly unless definitely employed. Illinois, Maryland, Pennsylvania, and Missouri (St. Louis and Kansas City only) are examples. (*d*) Laws on compulsory education have frequently been nullified because the amount of attendance each year was not specified, and consequently evasions were easy. Even yet some states prescribe a minimum amount, *e.g.* Iowa, 16 consecutive weeks; Missouri (outside of St. Louis), not less than half the term; Nebraska, two thirds of term. The majority of states having well-developed legislation now make attendance obligatory for the entire term during which school is in session. (*e*) Recently special legislation in some states provides for compulsory attendance from 8 to 20, at State School for Deaf. Nebraska, Minnesota, and North Carolina (for whites), have somewhat similar legislation. In early stages poverty of parents paved the way for exemptions, but the modern tendency is away from this. Many states provide for supplying free books to needy children. In Ohio and Colorado boards of education must give aid in clothing where it is necessary. In some large cities philanthropy has secured the provision of scholarships for those whose parents need aid in keeping children at school. (*f*) Much good legislation relating to children breaks down because of poor machinery of enforcement. In Connecticut there is a state agent with assistants who attends to the execution of laws on compulsory education and child labor. In all other states the enforcement of the law is local. In nonurban areas school boards and local constables are authorized to proceed against parents failing to keep children in school; in cities it is now common to constitute special attendance officers with limited police powers. Most of this machinery is yet very defective. Two main difficulties present themselves in the way of reform: —

Registration of children. — The lack of adequate registration of the school children contributory to a given school is the first. In the absence of any registration the attendance officers do not know at the beginning of the year what children are eligible for attendance at school. They do not know what children are being sent to parochial schools, and they have no systematic means of finding the children who are legitimately out of school owing to health conditions. In case children are obliged to attend evening school, there is no adequate means of knowing whether such attendance is made or not. At the end of the year there is no evidence as to how much of school attendance a given pupil has made. Attendance officers are obliged to do their work in a most unsystematic fashion, seeking children in parks and other places of resort.

All of these difficulties are to be obviated through a system of registration by which all of the children of a given area will be enrolled on cards and these cards kept in some central place in the area, preferably the school principal's office. The attendance officers could take these cards shortly after the opening of school and make note of all children not attending. The attendance of local parochial schools could then be taken, and there would finally remain a small number of names unaccounted for. The attendance officer would then immediately visit the homes of these children and take account of the reasons for their absence. A similar procedure would apply in the case of enforcing evening school attendance for pupils from 14 to 16.

In the enforcement of compulsory education a serious difficulty has arisen in the matter of counting the equivalence of nonpublic education. This imposes serious difficulties on officers engaged in the enforcement of the law. The Ohio compulsory law required every parish school to furnish the names, ages, and places of residence of its pupils. One large school refused to do this on constitutional grounds, but the Supreme Court decided that the law was not unconstitutional, in that it did not really interfere with the right of parents to educate children according to the dictates of their conscience.

Again a series of difficulties were encountered in Wisconsin and Illinois about 1890 regarding the states' right to inspect the quality of instruction given in private schools. Nothing is accomplished for the State by mere attendance. The so-called Bennett law in Wisconsin opening the way to state inspection of private schools was fought and finally repealed, but it is a fact that Massachusetts, Connecticut, and Rhode Island have all along recognized the right of inspection of private schools, though in no very formal manner. To a certain extent compulsory attendance must stand or fall with the right of inspection of private schools.

From the start it has been found that the satisfactory execution of attendance laws requires special adjustments within the schools. Children forced to come to school against their will, or with little interest in school, cannot be classified with children who attend regularly. Those disposed to be truants should have special schools where close discipline may be exercised. Those merely irregular need ungraded or specially graded classes for their accommodation. Under former conditions of administration it was customary to expel the incorrigible pupil from school. Whatever the effect of this on the pupil expelled, it at least had the effect of removing from the schoolroom what was commonly a source of moral contagion and of great difficulty to the teacher. This class of children still exists; and no adequate compulsory measures can be directed toward them unless special schools are provided. The school authorities themselves will hardly coöperate in enforcing the law if such is not the case. New York State passed its first compulsory law in 1874; after fourteen years' trial it was found that the law had not modified school attendance, had not secured the coöperation of school principals, and was substantially a dead letter. The machinery for its execution was inadequate, but at bottom it was a question of lack of accommodation for the difficult pupil.

Within recent years it has become obvious that at least three and probably four different types of special class or school are necessary in any city to procure the adequate carrying out of the law. (*a*) Those pupils who have become quite incorrigible, and whose parents have lost control of them, must be sent to an institutional school, committed for a term of years. Only thoroughgoing reform is adequate. (*b*) A day truant school, where hours are long and manual work abundant. This school, while allowing pupils to sleep at home, should aim primarily to keep them off the street and away from contagion of bad company. Such schools do not exist in America, but are found in English cities. (*c*) Special classes should be provided for pupils who cannot easily be brought under the ordinary school discipline. These classes may have the same programs as the ordinary classes, but should be under charge of teachers of sufficient maturity, experience, and personal character to cope with this type of child. (*d*) Possibly a fourth type of class should be for those who by irregular attendance have hopelessly fallen away from the regular class attainments.

The registration of children is not a function that can be adequately carried on by the police department. It should center around the school, and the officers responsible for it should be finally amenable to the education authorities. Labor officials and others concerned with the enforcement of child labor laws, inspection, and so forth, dealing as they do with the minority of school children, should always have access to the registration cards in order to get any special information that they might require. Calculations have shown that, with the system of registration once started, an average of one attendance officer to four or five thousand school children can easily carry out the provisions of compulsory registration. The cards should be so arranged as to receive at the end of each year a statement of the amount of attendance made by each pupil, whether in public or private school, and also some statement as to reasons for absence.

Until some adequate system of registration is enforced, and the machinery for it built up within the school system, it would appear that a great many of our efforts in the direction of compulsory attendance must be futile, and must also tend to bring the law into contempt.

Classification and Treatment of Truants. — The second difficulty lies in the unsatisfactory methods of classifying and treating the pupils who have already become addicted to truancy, or who are misfits as far as the school is concerned. It is well known that principals of schools will often fail to aid in the enforcement of the law when the boy concerned is one who, if forced back into school, does not profit by its work and is a continual source of disturbance. The ordinary schoolroom is not and should not be a reform school, and a principal often feels justified in refusing to inflict on a schoolroom with forty well-disposed pupils, a boy who has become addicted to truancy, and has become a possible source of moral contagion to the remaining children. The school principal knows that one or two spoiled children may claim an altogether disproportionate share of the teacher's time and energy, and may also very materially demoralize the schoolroom. On the other hand it may not be at all practicable to send such a boy to the reform school.

The obvious remedy lies in the fuller development of disciplinary classes, one of which at least should be attached to each large school, and the principal should have full power of commitment to this disciplinary class. The disciplinary class would, of course, be an ungraded class, and the teacher should be specially selected and compensated, and not more than 20 or 25 boys should be kept in a room. Attendance in this disciplinary class should continue as long as it seems that the pupil is mentally or morally a misfit for the regular schoolroom.

Beyond this disciplinary class there should be a day truant school of a type not now found in America, but which is working very successfully in certain English cities. This day truant school should receive all children who are too incorrigible for the disciplinary class, and who possess homes which are capable of supplementing the school work. In the day truant school the program should be very different from that in the elementary school. The school day should be long, from 9 to 12 hours. There should be abundant opportunity for supervised play, and half of the working hours should be given to some form of industrial work. By this means the boys would be kept off the streets, something which is not practicable in the ordinary school. The systematic course of treatment would result in the building up of right habits, and the school itself would keep in close touch with the homes.

Of course, for children who have got quite beyond the control of the parents, or who come from so-called broken homes, the ordinary boarding reform school is the only solution. These schools already exist, and the procedure for the commitment of cases to them is well known. Until we have some such fundamental classification and segregation of the more difficult cases of truancy as that proposed above, it would be very difficult to enforce the law with regard to a large group of boys for whom it is especially necessary.

The American states are obviously moving toward certain standards in compulsory attendance which will partly depend upon development of additional school facilities. For example, child labor legislation is increasingly closing up industries to youths under 16. The raising of educational standards will compel many children to attend school until they are 16. The State will provide for those who are demonstrably needy, rather than allow dependent parents to withhold from children their educational heritage. The increasing appreciation of the need of vocational education will result in the provision of special school facilities for imparting either the whole or part of this education. It is not improbable that the advanced position of Germany in this respect (*i.e.* compelling children from fourteen to eighteen to give part time to continuation education of a vocational or other character), will be imitated. Special schools will be provided for defectives and delinquents, and attendance at these made obligatory. Ultimately a complete system of registration of all children must be provided, to be carried on by attendance officers and centralized in each limited school area, not only for the enforcement of attendance, but for obtaining compliance with child labor legislation, and the provision of medical or other aid. D. S.

See articles on CHILD LABOR, OFFICIAL STATE PUBLICATIONS ON EDUCATION, and on the various national systems.

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ATTENDANCE OFFICERS. — See ATTENDANCE, COMPULSORY.

ATTENTION. — The Conscious Activity of the Mind. Attention is the great gateway of the mind. Through it must pass every sensation and every idea which would gain access to the field of consciousness. This fact is sometimes expressed by saying that the mind always has a focus point, that thoughts momentarily in this focus are more intense, or at least clearer and more distinct, than those outside. Only such thoughts as gain entrance to this focus really come to full and complete consciousness. Many others succeed in forcing their way into the margins of the focus, but further than that they do not get. This selective property of mental activity, this fact of concentration it is to which the term "attention" is applied. Evidently it is one of the most fundamental attributes of the mind and one which must condition every stage of mental development and education. We may well ask first what influences are responsible for the success or failure of particular items to secure a place in this focal region of the mind.

Primarily, no doubt, one's inherited nervous organization is the most important element. A child may be relatively more sensitive to sound than to light. In this case his primitive consciousness will tend to be dominated by auditory experiences rather than by those of a visual kind. In later life this bias toward one sensory realm may lead to the formation of a serious *interest,* which will control his entire career. He may thus be led to become a musician. Certain sorts of stimulation appeal strongly to all of us by virtue of our common human ancestry and without regard to the peculiar personal organization which we may chance to have acquired in the vicissitudes of inheritance. All intense stimuli thus tend to arouse attention. All emotional objects, such, for example, as those which occasion fear, anger, love, and all the stronger feelings, tend similarly to transfix our attention at the expense of less exciting competitors. On the other hand, attention is often drawn through the influences of experience to objects which inherently possessed no attraction. In this way one may be led into some form of employment with no other interest than the securing of a livelihood, but in the progress of time the duties therewith connected may take on an interest which renders them most alluring to attention.

Psychologists have been in the habit of using several classifications of the various ways in which we exercise our attention. They speak of sensory or ideational attention, depending on the particular nature of the conscious fact to which we attend. If some object present to the physical senses is the focus of attention, we have the first variety; if the object is a thought in the mind of something not present to the senses, we have the second form. Again they speak of immediate or derived attention, depending on whether the thought is one possessing inherent interest or one gaining its power over the mind by virtue of some relation to another object itself having such attractiveness. The interest of the youth in the maiden is direct. His interest in his profession may be only indirect or mediate, brought about by the possibility that it may afford means to care for the maiden. Both these divisions seem to be based on circumstances more or less extrinsic to the act of attention itself. A more genuinely intrinsic division is that into spontaneous, involuntary, and voluntary attention.

Spontaneous attention is sufficiently explained, perhaps, by the very title. Whenever we attend willingly and without effort, we have in some measure spontaneous attention. In the life of the child such attention is manifested by the response to almost every form of sensory stimulation. It is manifested by everybody through the interest in objects which appeal to our feelings strongly, especially those which please or excite us powerfully. Involuntary attention is represented by such experiences as those in which we are assailed by some extremely intense stimulation, like a violent noise, to which we are obliged to attend, momentarily at least, whether we so desire or not. Morbid ideas sometimes exercise a similar coercive influence over attention. The mind cannot leave them alone, no matter how great the effort. Voluntary attention is exercised whenever we attend as a result of a definite purpose and effort so to do. The student applying himself to his task in the face of distraction represents this form of mental activity.

Different as these three kinds of attention at first sight appear, there is reason to think that they are in reality derivatives of a common primitive type, *i.e.* spontaneous attention. As the mind gains in maturity, its ideas become systematized and arranged with reference to definite desires and purposes. The need of food and warmth may be taken as illustrations of influences which from the very beginning exercise pressure on the mind, and thereby little by little force attention to display preference for such objects and ideas as are pleasurably related to these items, with a corresponding neglect of all other competing items. This organization of a set of relatively permanent interests is the beginning of voluntary attention, which thus grows out of the spontaneous type of attentive process. Involuntary attention in the case of ideas is essentially pathological. In the case of sense stimuli occasioning this form of attentive response, it is simply an expression of the evolutionary value of giving heed to strong stimuli so many of which are dangerous for the organism. If violent stimulations did not contain menace for the welfare of the individual, most of the instances of involuntary attention would never occur. Until voluntary purposes are formed involuntary attention is indistinguishable from spontaneous attention. When these purposes are matured, involuntary attention remains as a safeguard against too great absorption in purely intellectual forms of interest with forgetfulness of the possible dangers and demands of physical nature.

One of the interesting problems connected with attention is that of the number of objects to which we can attend simultaneously. A great many striking experiments have been performed, showing that in a practical way the number of elements which may enter into the focus of attention varies widely under different circumstances. For example, if 3 letters be exposed to the eye for a fraction of a second, it may be impossible to read more than one of them with certainty. But if they spell a word, they can be readily recognized, and under such conditions even more letters may be correctly read in the same period of time. However many elements may thus enter into an object of attention, they are combined by the mind into essentially one "thing," so that psychologically speaking it may be said that we attend to but one object at a time. The problem as to how many *movements* we can perform at once must be sharply separated from the problem just stated. We can do an indefinite number of things at one time, the only limitation being native skill and practice. But such achievements do not involve attending to each part of the activity. Indeed, it is only as we learn to get along without attending to the details that our skill rises toward perfection.

Another interesting feature of attention is the fluctuating or rhythmic character of it. The reasons for these fluctuations have been sought in various directions: they have been attributed to fatigue in the muscles involved in the retention of our bodily attitudes; they have been referred to fatigue in the cells of the cerebral cortex, etc. Indeed, some evidence has recently been brought forward to discredit the belief that the fluctuations are really attributable to attention at all. But in a practical way there can be no doubt that attention has periodic shifts. Certainly if we wish to continue our attending to a given subject of thought, we find it necessary to keep noting something new about it. Simply to fixate it in a blind sort of fashion results in our suddenly finding ourselves attending to something quite foreign to the topic with which we started. The length of these periods of fluctuation depends on many circumstances which forbid any general statement. But they may be said to be relatively brief, in many instances not more than 2 or 3 seconds, often much less.

Attention sustains certain important relations to other parts of mental life which deserve special mention. In the first place, attention is all-important for memory. A good memory depends on many factors, but on none more invariably than upon attention. Nine tenths of all the inability to remember which vexes the life of the ordinary person, and especially the ordinary school child, is due to inattention, *i.e.* attention to something other than the thing to be remembered. On the other hand, all persons who possess good memories are capable of concentrating their minds with firmness and at will upon the matter in hand. Five minutes of such concentrated attention is worth an hour of the diffused and wandering attention which is the best contribution that many students ever make to their intellectual development.

Attention is also related to habit, to will, and to motor activities in the most intimate manner. It is a commonly accepted doctrine among psychologists that attention is the cardinal fact in the exercise of the will. What we attend to is that which determines what we will. Indeed, to attend fixedly to an idea of action with complete disregard of all competing ideas is to will the act. Only by the power of inhibiting ideas is any idea ever prevented from immediately occasioning action. To attend unwaveringly to an idea is to forestall this inhibitive process and thus bring action to pass. The principles of attention are accordingly the principles of the will. Not only, however, are motor activities consequences of attention; they are also conditions of its occurrence. To give attention to an object of vision requires a certain accommodation of the muscles of the eye. The same thing is true of auditory attention, and even attention to ideas involves certain bodily attitudes which facilitate, if they do not render possible, the directing of attention to intellectual ends. In the last case these attitudes are generally such as tend to assure freedom from distraction and the securing of an easy bodily position from which fatigue will not speedily arise. It is furthermore a commonplace of modern psychology that habits are built up by a slow process in which we first give attention to the various steps in the coördination to be learned, whereupon little by little we find ourselves coming into possession of the power to execute the act, whatever it may be, without any thought and with an increasing speed and accuracy that is almost miraculous. Learning to master the typewriter or the piano will illustrate the point. Attention to motor activities is therefore the first step in that most significant of all the chapters of our life accomplishments, *i.e.* the process by means of which we come to command hundreds of automatic acts which take charge for us of the routine of everyday affairs. Walking, eating, dressing, — what is there which does not illustrate the matter?

The foregoing sketch contains certain obvious implications for educational procedure and theory. An attribute of the mind which is of fundamental consequence for memory, for will, and for the formation of habit must possess extreme importance for education. The significant educational problems which center about attention may be formulated as follows.

How can children be taught concentration of attention? Without such concentration memory can never be reliable, and efficiency of every kind will be on a low level. How can voluntary attention be superposed upon spontaneous and involuntary attention, or inattention, as the latter conditions are often called? No one has achieved any material mastery over himself who cannot at will control his attention even amid distractions.

On the whole, modern psychology agrees with pedagogical practice in the general character of the reply which it makes to these questions. Concentration can only be gained by successful appeal to interest (*q.v.*). This interest may be of a highly vicarious type, as when, under the older régime, the birch was introduced to secure concentration of attention upon classical literature. Or it can be direct, as in the modern efforts so to arrange the curriculum as to meet the child's mind on the level of its native vital needs. In actual execution this latter method is often charged with sentimentalism and mushiness. It is not yet clear that consequences such as would justify this charge necessarily emanate from it. Voluntary attention is generally procured by the appeal to the indirect rewards, and naturally, for such attention is precisely that variety where in the nature of the case interest is not felt in the task itself. Here again, however, the actual practice differs widely; in some schools the incentive comes almost wholly from fear of punishment, in other schools it is connected with rewards of one sort or another. In whatever manner gained, nothing is clearer than the fact that in one way or another the capacity to stand being bored and uncomfortable is a *sine qua non* of any high mental efficiency.

Interest conceived in a broad and sane way is doubtless the clew to a deeper solution of the educational problems of attention than any other yet suggested. But it must be interest viewed from the standpoint of deep, persistent, socialized human needs, not from that of transient, ephemeral likes and dislikes, which would speedily reduce to chaos any educational system that undertook to recognize them. We always do appeal to interest of one kind or another, and always *must* so appeal in our efforts to train attention. The only problem which we have to face, therefore, is that of selecting the special type of interest upon which we shall place our reliance and seeing to it that we employ it in a way to encourage the qualities we desire to develop, rather than defeat the end for which we strive. J. R. A.

See Discipline, Formal.

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ATTITUDE. — A term which has been used to describe in a general way the reaction of a subject upon any impression received from his environment. Used in this fashion it is sufficiently comprehensive to include feeling, attention, and other similar general phases of mental experience. It refers also to bodily activities when these are directed toward given objects, and thus serves the useful purpose of associating in discussion mental states with the bodily reactions which they condition or by which they are themselves conditioned. Thus one speaks of an attitude of disgust or pleasure, and includes at once the inner mental emotional experience and its physical external accompaniments of muscular response. C. H. J.

See Ability, General and Special; Individual Differences.

ATYPICAL. — Deviation from the normal or typical in either direction, *e.g.* both genius and idiot are atypical in comparison with normal individuals. See Abnormal; Exceptional Classes, Education of, Individual Differences.

ATYPICAL CHILDREN. — See Defectives, Education of; Defectives, Schools for.

AUBURN THEOLOGICAL SEMINARY, AUBURN, N.Y. — Established in 1819 by the General Presbyterian Assembly for the training of ministers. Students who have graduated from college with the degree of B.A. are admitted, although candidates over 25 are admitted on examination. The degree of bachelor of divinity is conferred at the end of 3 years' study. Courses in religious pedagogy and Sunday school history and principles are given. There are 10 professors and 1 instructor on the faculty. Rev. George Black Stewart, D.D., LL.D., is the president.

AUDIOMETER. — An instrument for determining the degree of auditory sensitivity and discrimination of sound intensities possessed by an individual. The audiometer, or acoumeter, enables one to produce sounds of a uniform character, but of variable and measurable strength. At present audiometers are built on the principle that the sound in a telephone receiver varies with the strength of the current which is sent through it. Tuning forks, singing flames, falling pellets, falling hammers, have been used for the same purpose, but are not practical. The almost universal substitute for an audiometer is a ticking watch held at variable distances from the ear. (For the history of audiometry and illustrations of the different types of audiometers, see Vaschide, "De l'audiometrie" in *Bulletin laryngologie, otologie et rhinologie*, Vol. V, Sept., 1901.) The audiometer is used in psychology, as in the measuring of sensitivity and discrimination for the intensity of sounds, auditory attention, auditory fatigue, the effect of physical and mental stimuli upon hearing, etc.; in education, for the determination of hearing ability of school children, or selected classes of people; in medicine for proving up cases under treatment by the aurist. C. E. S.

AUDITORY. — See Hearing.

AUDITORY DISCRIMINATION. — This term may refer to the ability to distinguish intensities or to the ability to distinguish qualitative differences, especially of tones. The measurement of auditory discrimination for intensity is one of the best known of the so-called *mental* or *sensory tests* (*q.v.*). The measurement consists in determining how small a deviation in intensity from a given standard tone an individual can hear. The magnitude of this *least perceptible difference* in intensity of tone, together with the measurement of the reliability of that magnitude, are taken as indices to the capacity for intellectual use of the difference in the strength, loudness, or intensity of sound. (See Audiometer.)

Keenness of tonal hearing is measured by the threshold of discrimination, *i.e.* the smallest vibration difference which can be perceived as a difference in pitch. Individuals differ greatly in this capacity, and lack of tone discrimination is not necessarily a sign of lack of general mental ability. A good musical ear will detect a pitch difference of one vibration or less; ordinary students of music may get along with a discrimination of from 1 to 5 vibrations, and those who cannot discern less than 5 to 15 vibrations may be able to appreciate something of music. But those whose discrimination lies beyond 15 vibrations, should not, and seldom do, have anything to do with music. These estimates are given upon the basis of measurements at 435 vibrations per second. At this point 1 vibration is equivalent to about $\frac{1}{54}$ of a tone. This discrimination can be measured most conveniently by a series of tuning forks, each fork varying from the standard by small steps in a series. The discrimination is usually keenest about the age of 10, provided the child has had sufficient training at that time to understand the meaning of pitch. The measurement may be made so as to determine approximately the *physiological limit,* which is the limit set by the physical structure of the ear, and if this is done, no improvement will result from training. It is therefore possible to use the discrimination test for diagnosis, early in childhood, to determine whether or not the child is physically capable of musical appreciation. A class of eighth grade pupils will show a better average record than a class of university students. Girls and boys have about equal ability in this respect. Poor discrimination results in lack of real enjoyment of music, and usually makes music pupils dull. C. E. S.

AUDITORY PERCEPTION. — Certain phases of auditory perception are of importance because the organs of hearing are especially significant in all social intercourse. The human ear differs from the animal ear in that it is employed chiefly for the recognition of fine distinctions in sound. It would be disadvantageous for a human being to have the long, funnel-shaped ear of an animal, since this funnel would act as a resonator and modify the character of external sounds, thereby obscuring many of the differences essential in the recognition of language. The ear of the animal is employed in the recognition of the direction from which sounds come. In human experience recognition of spatial relations through sound is relatively undeveloped. This recognition of spatial relations through sound depends very largely upon binaural hearing (*q.v.*). Other phases of auditory perception are discussed under BEATS, COMBINATION TONES, TONES AND NOISES. See also DEAFNESS; TONE DEAFNESS; and PERCEPTION. C. H. J.

AUGSBURG SEMINARY, MINNEAPOLIS, MINN. — Founded in 1869 by Norwegians at Marshall, Wis., to train ministers for the Lutheran Free Church; removed to the present location in 1872. The basis of the institution has, however, been broadened, and in addition to the theological course, preparatory and college departments are maintained. The admission requirements to the college are equivalent approximately to 2 years' high school work. The degree of B.A. is given in the college on completion of the 4 years' course, and the degree of *candidatus theologiae* in the theological department. Nearly half the number of students are in the preparatory department. The faculty consists of 10 professors and 6 instructors and lecturers. Professor Sven Oftedahl is the president.

AUGUSTANA COLLEGE, CANTON, S.D. — A coeducational institution of the United Norwegian Lutheran Church of America, originally the Lutheran Augustana School, founded in 1860 and located at Chicago, since when it was moved several times, and finally to Canton in 1884. Preparatory, academic, normal, music, and commercial courses are offered. The 4-year normal course leads to a 5-year state certificate on the graduation diploma. A parochial normal course of 2 years is also maintained to prepare teachers for Lutheran parochial schools. There are 11 instructors. Anthony G. Tuve is the president.

AUGUSTANA COLLEGE AND THEOLOGICAL SEMINARY, ROCK ISLAND, ILL. — A denominational institution owned by the Evangelical Lutheran Augustana Synod of North America, founded in 1860. While primarily intended for the preparation of ministers, the institution now includes preparatory, academic, collegiate, normal, business, and music departments. Admission to the college is by certificate from any state accredited high school, the academy, or by examination requiring about 12½ units. In the college six groups are offered — classical, modern language, Latin-scientific, general science, premedical, and mathematical. Degrees are granted on completion of prescribed courses. Students may enter into the normal department from the preparatory. Candidates are admitted to the theological course who have graduated in a college course. Three years' residence is required for the B.D. degree. The archives of the college contain a historical collection of American Lutheran and Scandinavian American literature, and files of the leading American Lutheran periodicals. There is a faculty of 42 professors, instructors, and assistants. Rev. Gustav Albert Andreen, Ph.D., R.N.O., is the president.

AUGUSTINE OF CANTERBURY. — As the founder of the English Church, St. Augustine was the father also of English education. For the school had in those days become an inseparable accident of the church. Nothing is known of Augustine's birth or life before he, being a monk and Prepositus or Provost of St. Andrews monastery at Rome, was selected by Pope Gregory the Great in 595 to go out as a missionary to England. He was to go at first to Deira, or Yorkshire, to convert to Christianity the people whose golden-haired sons, according to the legend told by Bede, had attracted Gregory's attention in the slave market, as looking like angels rather than Angles, and, being Deirans, to be saved *De ira Dei.* But when in Gaul, on his way to England, Augustine heard such dreadful accounts of the fierceness of the North that he and his 30 companions gave up the mission and returned to Rome. They were sent out again, this time to Canterbury instead of York, because the Queen Bertha, being a Frankish princess, was a Christian, and, according to Gregory's letter to her, "endowed with learning." Ethelbert, her husband, was converted, and in 602 or 603 Augustine, having been made bishop in 597, consecrated Christ Church, an old Roman church, it is said by Bede, as a cathedral. Though Augustine is never spoken of as a learned man otherwise than in the scriptures, he, of course, knew Latin and was able to teach it. He was expressly told by Gregory that, being a bishop, he must give up the monastic life and live like other bishops with his clerks, but, being a monk, he should live with them not on a separate portion of the episcopal estate, but like the early Christians, having all things in common with them. That he set up a school is to be inferred from Bede's mention (iii, 18) of the Canterbury School as a thing of course, when he recounts the establishment by Sigebert, King of the East Angles, on his return from exile in Gaul, " wishing to imitate what he had seen well arranged there," of a grammar school (*scolam in qua pueri litteris erudirentur*). Bishop Felix, whom he had got from Kent, helped him, and " provided for them (the boys) pedagogues and masters after the fashion of the people of Canterbury." Augustine's episcopate was very short. After a signal failure, due to his insolent assumption of superiority, to bring the British bishops to acknowledge his primacy and enter into communion with the English church, which, besides Canterbury, consisted only of two bishoprics, London and Rochester, he died May 26, 605. A. F. L.

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AUGUSTINE, ST. (354–430 A.D.). — Bishop of Hippo, and one of the most noted of the Latin Fathers. He has the high educational interest of exhibiting the Latin culture to us at the moment when the Western Empire reaches its pedagogic culmination, and then revealing one of the causes of the decay of culture and education in Europe. Born at Thagaste (now South-Arras, in Algeria) on Nov. 13, 354, he passed through the hands of the public elementary teacher (*calculo* or *literator*), and went on to the higher school of the *grammaticus* or *literatus*, another municipal institution, for Greek and Latin letters. Greek he never adequately commanded, and it is not without bearing on the inexactness of his erudition that the *grammaticus* merely gave his pupils history, geography, etc., in the form of a rambling commentary on the poets. Donatus was just then beginning his reform of the *grammatica.* As he was intended for the bar, he then studied rhetoric at Madaura, in the third and highest grade of municipally subsidized school.

In his sixteenth year Augustine, whose father — a pagan, and curial of his town — had just died, was sent by a wealthy uncle to the metropolitan school (a kind of provincial university) at Carthage. Here logic, music, mathematics, and astronomy were imparted. The reading of Cicero's *Hortensius*, in his eighteenth year, gave him a serious bent for philosophy, and he embraced Manichæism. Abandoning his forensic ambition, probably from lack of funds, he returned to teach grammar at Thagaste, and continue his study of philosophy. There he wrote his first treatise, *De Apto et Pulchro,* which has not survived. In 379 or 380 he opened a school of rhetoric at Carthage, but the unruly conduct of the pupils and a breach with the Manichæans induced him to leave Africa. In 384 he opened a private school of rhetoric at Rome, and in the same year, disliking Rome, obtained the position of public teacher of rhetoric at Milan.

The religious condition of Rome had inclined Augustine to the philosophy of the New Academy (skepticism), and he had two years of great unrest. At last a " Platonist " (more probably a Neo-Platonist — his references to Greek schools are always loose) work removed his materialistic difficulties, and he yielded to the entreaties of his mother, St. Monica, and St. Ambrose. With a few pupils he retired to a villa toward the Alps, and there wrote or dictated — shorthand was in common use at the time — a series of Platonist treatises and discussions (*Contra Academicos, De Beata Vita, De Ordine,* and the *Soliloquia*). He returned to Milan for baptism in the spring of 387, and set out for Africa.

Losing his mother at Ostia, he proceeded to Rome and began his long controversial career with a vigorous campaign against the Manichees. On his return to Thagaste he converted his father's house into a religious-philosophical community, and wrote his *De Vera Religione* (in which his philosophic stage culminates), *De Genesi* (a liberal interpretation), and *De Musica.* His fame for asceticism (of philosophic moderation) and learning made him so much sought as a bishop that he had to move about warily, but he was captured and made auxiliary bishop by the little *paroecia* at Hippo in 391. In the succeeding years of heavy controversial work against Manichees, Pagans, Donatists, and Pelagians, his zeal for culture wholly disappeared. He ceased to read lay works, derided questions of natural science, and came to speak of Plato as " that fool." Only when he comes to write his *De Civitate Dei* — written at intervals from 413 to 427 — against the cultivated pagans do we realize the culture he had garnered. All the weightier writers concur that his erudition was as loose and ill disciplined as it was vast and varied. The fault lies with the pedagogy of the time, and his later absorption in controversial work. He was one of the most learned, and the most subtle and philosophical, of later Latin writers.

In the kind of small seminary, or clergy-house, which he established at Hippo, there was no systematic teaching, nor did he demand any in the monasteries which he encouraged. He, however, laid down rules for the systematic study of scripture in his *De Doctrina Christiana* (397 and 426), wrote a small manual *De Catechizandis Rudibus* (400), and in 423 compiled for a rebellious community of nuns the code of regulations which became the *Rule of St. Augustine.* His *Retractationes* (426 or 427) embody the idea of revising rather than retracting, but show a wide removal from his early philosophy. He died on Aug. 28, 430, saddened by the spectacle of the Vandals destroying his whole lifework.

Augustine is perhaps best known as the author of the *Confessions,* an account of his life up to the time of his baptism. Whether the work, which was written about 400, was motivated by a desire to moderate the enthusiasm of his admirers or to praise God for his conversion, it is marked by the care with which the author lays bare his inmost thoughts. As a psychological study of the development of a human soul, the *Confessions* have a strong interest for the reader. In addition to the narrative of his own life the author includes discussions of philosophic and religious questions. J. MacC.

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AURELIUS. — See Marcus Aurelius.

AURICULAR INSTRUCTION. — See Deaf, Education of.

AUSONIUS, DECIMUS MAGNUS. — Born at Bordeaux about the year 309; was educated in the city of his birth, and afterwards at Toulouse, under the auspices of his uncle, the rhetorician Arborius. His studies were principally, after the manner of the time, in Latin and Greek grammar, rhetoric and law. After essaying the practice of law Ausonius turned to the art of teaching, and accepted a chair of grammar at Bordeaux, in which he was eminently successful, finally becoming a rhetorician and the most conspicuous teacher in Gaul. His fame reached the ears of Valentinian, who called him to the imperial court, intrusted him with the education of his young son Gratian, then a lad of 8 years, and thus permitted him to compare himself with other tutors of princes, including the great Seneca, Fronto, and Lactantius. It was perhaps at this time that Ausonius first professed himself a Christian, and the shallowness of his profession accorded perfectly with that of the Emperor himself. The good fortune of Ausonius gave a new impulse to his muse, and won him the friendship, besides, of such notables as Symmachus and Probus.

Gratian had barely emerged from the age of tutelage, when he succeeded, in 375, to the government of the empire, and soon bestirred himself to reward his teacher. Ausonius became prefect of Africa and Italy, and afterwards of Gaul; and the sum of his honors was completed by the gift of the consulship for the year 379. But the downfall of his protector was near, and with the fall of Gratian Ausonius retired from court to the nest of his old age in Aquitaine, notwithstanding that apparently the favor of Theodosius also would have been extended toward him. Here he superintended the education of his grandson, wrote elegies to his parents and the professors at Bordeaux, and poems inspired by well-worn remnants of the ancient mythology; and here he may have died about the year 394. He lived in an age when true poetry was impossible; but his verses have delicacy and ingenuity, and traces of an original grace and love of natural beauty; and incidentally, they reflect considerable light on the methods and character of contemporary Roman education. They indicate the discipline of the schools, the content of grammatical studies, the widespread use of shorthand and mnemonic rhymes, the scope, specialization, and imperial support of higher education, the high culture of Gaul in the fourth century, and the arid and pedantic character of the literary instruction of the period. P. R. C.

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AUSTIN COLLEGE, SHERMAN, TEX. — Founded in 1849 by the Presbyterians of Texas, and first located at Huntsville, but removed to Sherman in 1876. Preparatory and college departments are maintained. The admission requirements amount approximately to 8 points of high school work. There is a faculty of 8 professors and 3 instructors.

AUSTRALIA, EDUCATION IN. — The character of Australian education is on the whole homogeneous; but the systems in operation in the different states are totally independent of one another and of the federal government, and must accordingly receive separate treatment. It is perhaps unfortunate that no provision of any character concerning education has been included in the act of federation; but this fact also indicates the general competency of the state governments with reference to educational matters. The peculiarity of Australian education is that the State not only controls, but completely and absolutely supports and regulates the system of public education, without support from or interference by the localities in which the schools may lie. Australian education tends therefore to be centralized, systematic, and homogeneous; but since local interest is naturally fitful, the external equipment of the schools is usually of an inferior character, while the qualifications of the teachers are distinctly superior. The schools are open 220 days or more during the year. Primary education is free, secondary education not so. The state secondary schools are fewer and somewhat less important than those of a semi-public, endowed, or denominational character. The universities of Sydney (New South Wales), Melbourne (Victoria), and on a smaller scale Adelaide (South Australia), and the University of Tasmania are excellent colleges after their kind, staffed by British professors, and reflecting oversea rather than Australian culture. A fifth university is about to be founded at Brisbane, Queensland.

Primary education throughout Australia is free, compulsory, and secular, notwithstanding that its development has been chequered by private and denominational influences. Victoria practically adopted the threefold ideal by an act of 1872, New South Wales in 1880, Queensland in 1875, South Australia and Western Australia in 1878. Until recently a nominal fee, threepence per week per child, had been charged upon such parents as were able to afford it, but all such charges have been repealed, partly upon principle, since the State owes education to its citizens, and the older generation to the younger, and partly for expediency, in that the half-concealed distinction between eleemosynary and contributing pupils had tended to become invidious.

New South Wales. — For the purposes of the present undertaking, it seems preferable to consider education in New South Wales as a type, rather than to attempt to describe education in each of the Australian colonies in an equally abbreviated way. The first white settlement was effected in Australia in 1788, at Sydney, New South Wales. It is clear that the earliest settlers were not blind to the claims of education, since it is upon record that the first church in Australia, built in 1793, was used also as a schoolhouse. An orphan school and asylum, founded in New South Wales in 1801, was supported by an endowment of 13,000 acres of land, also by harbor dues, various fines, and the confiscation of stray goats! In 1821 there were only 1524 children being instructed, out of a population of upwards of 35,000; and although the years 1824–1835 saw the establishment of a free grammar school, infant schools, the King's School, and the Sydney College (now Sydney Grammar School), there was great need of a liberal and extensive system of education such as only the State could provide. An adaptation of the monitorial system of Bell and Lancaster was in vogue in the primary schools. Thus education fared as ill as might be in New South Wales until 1848, when vigor was infused into the situation by the creation of a dual system of national and state-aided denominational schools.

The dual system was obviously wasteful and undemocratic in principle, but it was not until the superior efficiency of the national schools, largely due as it was to a system of training teachers and pupil teachers at a model school and training college in Sydney, had amply demonstrated their superiority to the public, that the complete victory of the national schools was assured. An act of 1866 abolished the dual boards in favor of a new Council of Education, and unified the organization of the two orders of schools. This act was superseded by that of 1880, which established a state department of education, under a Minister of Public Instruction with a permanent Under Secretary. Departmental officers and teachers were henceforth civil servants, and education was compulsory and practically secular and free, save that a portion of the time of the pupils might be set aside for the religious instruction of school children by the clergymen of their denomination, and a fee of threepence per child (recently abolished), not exceeding a shilling for one family, was paid weekly to the State. Meanwhile the University of Sydney, established in 1852, was steadily growing more influential and efficient. In 1902 a commission appointed to investigate and report upon the methods of education in use in Great Britain, the United States, and the principal countries of Europe was influential in securing several drastic changes, especially the abolition of payment by results and the pupil teacher system, and the extension of facilities for the training of teachers and for technical education. The great problem of New South Wales, and indeed of all the Australian colonies, is at present how to provide a more accessible and popular system of secondary education to facilitate progress from primary schools to the university, and to prepare scholars for the higher walks of commercial and industrial life.

In New South Wales all children between the ages of 6 and 14 years are required to attend a state or private school, or to receive regular instruction in some equivalent way. In a state having an area of 310,372 square miles, with a population of only 1,527,000, it is readily seen that the determined effort of the State to educate all its citizens is attended by unusual difficulties. On the other hand, the population is remarkably homogeneous, all but 2½ per cent being British or Australian born. It is remarkable that of the total population more than one third is concentrated in the city of Sydney, which accordingly is well equipped with public schools comparable to those of the other great cities of the world. The principal difficulty is to reach the sparse population of the inland districts. In order that this may be more effectually done, central schools are established in such localities, to which children are conveyed from a distance in suitable vehicles free of charge. Since the railways, like the public schools, are owned and operated by the State, school children are allowed to travel free by rail to the school nearest their homes, or to the nearest public high school, as the case may be.

The public schools are nonsectarian. General religious instruction is given, but this is not connected with any particular religious organization. Periods are set apart during which sectarian ministers may instruct the children who profess their respective denominations, subject to the consent of the parents or guardians.

While the public elementary schools are free, this is not the case with the public secondary schools. These, moreover, are few in number, though they compete successfully as to results with the great semi-public secondary schools which flourish in the Australian colonies as they do in England. While the extension of public facilities for secondary education is a question very ardently agitated at the present time, it ought to be stated that all of the larger so-called elementary schools of New South Wales give instruction to older boys and girls in secondary subjects, that not only the principals, but the assistant teachers in these schools are frequently university graduates, and that they are fully competent as at present constituted to prepare pupils directly for the entrance examinations of universities. It is therefore possible in fact, but not in theory, for pupils to receive advanced secondary instruction in the ordinary state schools. Many scholarships and bursaries enable children who are successful in competitive examinations to attend the secondary schools and afterwards the university free of any charge to their parents.

There are altogether 2918 state schools in New South Wales. At the census of 1901 it was found that only 8 per cent of the poputation of 5 years and over were unable to read. The annual expenditure of the government on education, science, and art is about £970,000 sterling. This is provided out of the consolidated revenue. There is no special tax or rate for education, and no local contribution is required from townships or counties for the support of schools. The number of pupils in attendance at the state schools of New South Wales in 1907 was 235,736. There were 60,000 scholars in attendance at private and denominational schools. The plan of giving state aid to denominational education was abandoned in 1880, and there is no likelihood of its revival. The training of state school teachers is in a stage of transition to a high and uniform level.

Technical education receives a rapidly increasing appropriation from the state government, amounting in 1907 to about £25,000 sterling. The several government technical colleges and schools together have an enrollment of about 12,000 students, male and female The State also conducts an admirable agricultural College and four experimental farms; and great expansion is taking place in the direction of agricultural education even in the rural schools.

Sydney University maintains a high standard of college education, and many of its graduates have achieved distinction in postgraduate study at British, American, and German universities. One thousand one hundred and sixty five students, including 136 women, attended lectures during 1906. The staff consisted of 15 professors, with an average annual salary of more than £1000, and 68 lecturers and demonstrators. The year's expenditure was £50,298 sterling, of which sum £13,750 sterling was granted by the government. This endowment has been increased in 1908 to £22,500.

It may be added that the Australian and Technological Museums count more than 357,000 visitors annually, that the free public library under the state Department of Public Instruction has nearly 200,000 volumes, that the new Mitchell Library contains the best collection of Australian books in the world, and that the national art gallery at Sydney has paintings and objects of art estimated at a value of £130,000 sterling.

School libraries, school banks, and school gardens play important parts in the lives of the children who attend the state schools. The older boys are drilled as cadets and are taught the art of rifle shooting. Swimming is also taught wherever possible in connection with the schools. A very lively spirit of progress has within the last few years taken possession of the educational world, dating on the whole from the accession of Mr. Peter Board, M.A., as permanent head of the department of public instruction. As in all the colonies, this department is under the final control of a minister for public instruction, who is nominated by the state premier, and whose tenure of office depends upon that of his party in Parliament. The director of education, or under secretary for public instruction, is the permanent head of the department subject to the minister who represents its parliamentary and fiscal interests.

Victoria. — It will be unnecessary to characterize Victorian education at such length, since in its general outline it resembles education in New South Wales. In this comparison, the system of Victorian education must be recognized to be equal and in some respects superior to that of New South Wales. Continuation schools of a vocational character are in their infancy in both colonies; but more practical progress is being made with them in Victoria. The equipment for the training of teachers is also superior in the southern state, which has, like New South Wales, a reforming director of education, Mr. Frank Tate, M.A., the author of an important report upon observations made during an official visit to Europe and America. Victoria is behind New South Wales in the establishment of central district state schools.

There are in Victoria at present (1908) 2088 state schools, having a total enrollment of 203,782 pupils. The state expenditure for 1907 was as follows: for primary education, £665,403 sterling; for secondary education, £5874 sterling; for technical education, £22,322 sterling; for university education, £21,000 sterling. The expenditures upon secondary and technical education are being rapidly augmented. The expenditure upon university education merely represents an annual grant in aid of the work of the University of Melbourne, which is not to be regarded as a state university, although the government college for the training of teachers is affiliated to it.

South Australia. — During 1907 there were in all 721 schools in operation in South Australia, having an average daily attendance in public schools of 31,365, and in provisional schools 6496, giving a total average attendance of 37,861. The number of teachers employed was 1389, of whom 419 were male and 970 female. The net cost of educational operations to the State was £150,157 sterling.

Western Australia. — In 1907, the average enrollment in the public schools was 29,679; the average attendance 24,950, or 84.07 per cent. The compulsory ages for attendance are from 6 to 14; but 8.8 per cent of the children are under 6 and 6.3 per cent over 14. In New South Wales a still higher percentage is found of children over 14, namely 9.3. In all there were 395 schools open during 1907. There were 744 regular adult teachers, 86 pupil teachers, and 56 sewing mistresses. An acute difficulty in Western Australia and all the sparsely populated districts in the Australian colonies is to find teachers for the increasing numbers of small schools. The average salary for all adult teachers in 1907 was £149. The total state disbursement for education during the financial year from July 1, 1906, to June 30, 1907, was £168,753.

Queensland. — In 1907 there were 2396 teachers employed in the state schools in Queensland, which numbered altogether 1090, including provisional schools. The gross departmental expenditure was £342,600 sterling. Of this sum £313,792 went to primary education, £6182 to scholarships and exhibitions, £7000 to endowments to grammar schools, £7749 to technical education, and £2070 to grants in aid of schools of arts. The average daily attendance for all schools, state and provisional, amounted to 66,849. Queensland is now principally occupied with the project of a university at Brisbane, the appointment of a sufficient number of itinerant teachers to penetrate the vast spaces of the interior, the establishment of continuation classes, and the improvement and extension of technical education.

Tasmania. — Although separated from the Australian continent by water, Tasmania is one of the states of the Australian federation. During the year 1906 there were in all 350 schools in operation. The total number of children taught in these schools during the year was 22,622, allowance having been made for those enrolled in more than one school during 1906. The average daily attendance was 13,730. This average is considered very low; moreover, the accommodation in the schools is less adequate than in other Australian states, and little attempt is made to enforce the clauses governing compulsory attendance. The total number of teachers of all ranks in 1906 was 546. Of these 12.8 per cent were pupil teachers. The total expenditure on primary education for the year 1906 was £57,819 sterling, while an amount of £2650 was devoted to technical education.

Fuller information may be obtained from the annual reports issued by the ministers for public instruction in the several states.

P. R. C.

AUSTRIA, EDUCATION IN. — Austria-Hungary is a constitutional monarchy comprising two states entirely independent of each other locally, but united through the identity of the sovereign and affairs common to both.

Austria comprises 14 provinces, with an area of 115,903 English square miles; population 26,150,708 (census of 1900). Hungary (excluding Croatia and Slavonia) has an area of 109,007 English square miles; population 16,721,574 (census of 1900). The educational system of Hungary will be treated in a separate article.

Historical Development. — The history of education in Austria deals not with the development of a single race, but of several races living in different territories, which have been united under one government in the course of several centuries. The earliest schools in what is now included in Austrian territory were the cathedral and monastic schools (*qq.v.*) of the Middle Ages. The establishment of these schools dates from the beginning of the eighth century, and until the thirteenth century they afforded the only means of instruction. During this period parish schools were established, but they offered little instruction except in singing and in the catechism, which were requirements of the Church. Universities were also founded, one at Prague (*q.v.*) in 1348 and one at Vienna (*q.v.*) in 1365. These were modeled, in general, after the University of Paris, with the faculties of arts, theology, law, and medicine.

At the time of the Reformation (1524) parish schools under the direction of the Catholic Church had been established in many of the towns and villages. Followers of Martin Luther were bitterly opposed, and attempts by teachers of the new faith to open schools were the occasion of strife. The Jesuits (*q.v.*), on the other hand, were encouraged to open schools which naturally strengthened the Catholic Church. This strife grew bitter in Austria, and finally culminated in war, which was detrimental to all schools and disastrous to the Protestants (1620). After this war the field of instruction was practically limited to the Catholic Church. During the seventeenth century, the schools of higher instruction were in the hands of the Jesuits, and primary instruction, still confined chiefly to religious teaching and the catechism, remained under the supervision of the Church; advance, however, was made in schools established by the Piarists (*q.v.*), in which, besides the catechism, reading, writing, and arithmetic were taught. Special schools for the nobility and schools for military training were opened in some of the cities during the first half of the eighteenth century.

Down to 1770 the government had exercised no control over schools further than to enforce the church regulations, to act as arbiter in settling disputes, and to permit the teaching of the poor in schools other than those of the religious orders. The first decisive step toward the formation of a state system of education was taken during the reign of Maria Theresa (*q.v.*). The defeat of her armies by Frederick the Great (1762) and the expulsion of the Jesuits (1773) both conduced to this result. A new education law, enacted 1774, provided for a central school commission (*Studienhofkommission*) which should exercise general control over all schools, and an administrative council in each of the provinces. The law further provided for three classes of schools, *Volksschulen*, or trivial schools (as they were called), *Hauptschulen*, or high schools, and normal schools. The *Volksschulen* were to be opened in every parish, for instruction in religion, morals, reading, writing, and arithmetic; the expense to be borne by the communities and the manorial lords. High schools were required in every circle or district for instruction in geography and history, composition, arithmetic and geometry, and the elements of Latin; and normal schools serving the twofold purpose of training teachers and of model schools in the capitals of the crown lands. Religious instruction was left to the clergy. The salaries of high school and normal school teachers were fixed, and the country teachers were recommended to the manorial lords and the communities for aid, and were also permitted to engage in other occupations. A publishing house for schoolbooks was established; textbooks and methods of instruction and discipline were prescribed. The school age was from 6 to 12 years. Sunday schools for the benefit of children who were over 12 years of age and not attending school, and for apprentices, especially, were opened. As a result of the reform many new schools were established, and a general desire for education was awakened throughout the provinces. In 1775, Bohemia had about 1000 schools, with 30,000 pupils; in 1789, 2244 schools, with about 165,000 pupils. In 1775 Mähren had about 10,000 pupils, and in 1785 about 67,000 pupils.

The movement already started was continued under the reign of Joseph II (1765–1790). Acting on the advice of the school commission, he sanctioned measures which made attendance at school compulsory on penalty of fine; relieved teachers from military service, and fixed a minimum salary, any deficiency being supplied from the school fund; and, what is of more consequence, he granted religious liberty to the Protestants (1781), which enabled them to establish schools.

Toward the close of the century the effects of the political movements in France were felt in other countries of Europe. The measures taken by Francis II to safeguard the empire, which consequently restricted the freedom of his subjects, tended at the same time to lower the ideals of the schools. His adviser, Rottenhan, maintained, however, that the object of the *Volksschule* was to make the laboring classes more industrious and amenable to the law, and that even the laboring man was capable of conducting a school. His views carried weight, as appears from the *Politische Verfassung der deutschen Schulen* (*Constitution of the Austrian Public Schools*), enacted in 1805. No change was made in the general plan of supervision for the state and crown lands, but the *Constitution* provided for district supervision by the clergy of the districts, who reported to the bishops or consistorial council and also to the magistrates; and it placed the parish schools under direction of the respective pastors of the parish in which the school was located.

The subjects of instruction for the *Volksschulen* were extended to include vocal music, the native language, and manual exercises. In towns the course of study was extended so that 20 hours of instruction a week should be given and an assistant teacher provided wherever required. Children of the poor were to be instructed gratuitously. Teachers must have received at least 3 months' normal training; the regulations determined their mode of appointment as well as that of school officers, and also specified requirements for the construction and equipment of schoolhouses.

Except for minor changes, the schools were administered according to the *Constitution* until 1848. During this period the province of instruction was extended, notably by the founding of schools of trades and industry. The technical high schools of Vienna, Prague, Gratz, and Lemberg were opened. From 1828 to 1847 the number of Sunday, or adult, schools increased from 8867 to 11,432. During the same period the number of superior elementary schools increased from 261 to 333, the *Volksschulen*, from 14,750 to 16,800, and the schools for girls, from 1380 to 2550.

The political upheaval in Europe in 1848 led to a revolution in Austria and the general demand for a revision of the constitution. The new era was marked by the creation of a ministry of public instruction replacing the school commission, which for three quarters of a century had controlled school affairs, and under the direction of the ministry new regulations pertaining to elementary schools were promulgated in 1848, followed in 1849 by a law for secondary and superior education.

Elementary education was made a first charge upon communities, the province and state to render assistance where local resources proved inadequate. Provision was also made for the establishment of "burgher" schools, offering advanced courses of instruction covering 2 and 3 years. This class of high schools afforded a general education for those who were not preparing for the university or technical schools.

Present System. — The organization of the system of public instruction under government direction was completed by the law of 1869, which is still in force.

Administration of Elementary Schools. — The minister of public instruction has general direction and supervision of the schools of the empire. In each crown land there is a provincial school council at the head of which is the superintendent of the province (*Landes-Schulinspektor*), who is the medium of intercommunication between the minister and lower authorities. Each crown land is divided into *Bezirke*, or school districts, the schools of which are supervised by a school council (*Bezirksschulrat*). The members of this council are nominated by the teachers of the district, and are appointed by the higher school councils. Each district is subdivided into smaller districts for the individual schools, which are under the control of local school boards.

Classification and Curriculum. — The elementary schools include the *Volksschulen* and the superior elementary schools or *Bürgerschulen*. Many of the *Volksschulen* are ungraded, especially in the country, while those in towns and cities have from 2 to 8 classes or grades. The subjects of instruction, and the plan for an ungraded school, are shown in the following table.

Subjects	Hours a Week		
	First Year	Second, Third, and Fourth Years	Fifth to Eighth Years
Religion	2	2	2
Mother tongue	12	10	10
Arithmetic	4	4	4
Natural history and elementary physics	—	2	2
Geography and history	—		2
Writing	—	2	2
Drawing, and elementary geometry	—	2	3 {For[1] girls 1 hr.
Singing	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{2}{2}$
Gymnastics	—	2	2
Total number of hours per week	19	25	28

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[1] Domestic science for girls.

Plan of studies for an eight-grade "burgher" school for boys: —

Subjects	Years — Hours a Week							
	1st	2d	3d	4th	5th	6th	7th	8th
Religion	1	1	2	2	2	1	1	1
Mother tongue	12	10	9	9	6	4	4	3
Geography and history	—	—	1	2	3	3	3	3
Natural history	—	—	1	1	3	2	2	2
Elementary physics						2	2	3
Arithmetic	$\frac{6}{2}$	4	4	4	4	4	4	4
Geometry, and geometrical drawing	—	—	—	—	1	3	3	3
Freehand drawing	—	$\frac{2}{2}$	$\frac{2}{2}$	2	2	4	4	6
Writing	—	2	2	2	2	1	1	—
Singing	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{2}{2}$	1	1	1
Gymnastics	$\frac{2}{2}$	$\frac{2}{2}$	2	2	2	2	2	2
Total number of hours per week	18	20	23	25	26	27	27	28

Compulsory School Attendance. — Attendance at school is compulsory in most of the provinces for every child from the age of 6 to 14. In Istria, Galicia, and Dalmatia, the age is from 6 to 12, and in Bukowina, from 6 to 13. The child is allowed to withdraw from school only when he can give a certificate showing that he has completed the required course of study. Children employed in large factories continue their education at special schools supported by their employers. Separate schools for boys and girls are common in the cities and towns, while in the country they are taught together. The cost of erecting school buildings and the payment for teaching is borne chiefly by the commune.

Although, from time to time, efforts have been made through the predominant influence of the German population to force the use of the German language upon all the provinces, instruction in the native tongue is a privilege which has been jealously guarded by the several nationalities, and consequently textbooks are printed in their various tongues. It is often necessary to instruct children of several nationalities in the same school, which greatly increases the teacher's task.

In 1906 there were 21,666 elementary schools, with 4,067,243 pupils. The languages of instruction in 1906 were as follows: German, 8194; Czech, 5496; Slavish dialects, 6448; Italian, 598; Rumanian, 150; Magyar 4; while in 277 schools more than one language is used. The total expenditure for elementary instruction was 121,058,000 kr. or $24,574,774.

Teachers and Teachers' Training. — Schools for the training of teachers in Austria were first established in 1774, and it was ordered that one such school should be provided in the capital of every province; upon the establishment of the schools a limited amount of training became compulsory on the part of the teacher. This requirement is still in force.

In 1905, there were 111 training schools for teachers, 57 for men, with 11,161 students and 993 teachers; and 54 for women, with 7519 students and 986 teachers. The course of training covers 4 years, and includes a review of the high school subjects, together with pedagogy, psychology, history of education, drawing, gymnastics, and music.

Teachers are appointed by the district council, and their nominations are confirmed by the provincial authorities. The general school law fixes the minimum salary, which may be increased by communities; hence the salaries paid in the different districts vary according to the wealth and progressive spirit. After 40 years' service teachers are entitled to a pension equal in amount to the salary received.

In 1906 the total number of teachers in the elementary schools, including special teachers of religion and manual arts, was 96,300.

Secondary Schools. — The history of secondary education in Austria for a period of three centuries is confined chiefly to the schools under the control of the religious orders, which were established as early as the fourteenth century. The State made no provision for secondary instruction until 1773, consequently these schools were conducted according to the regulations of the different orders controlling them. In the schools of the Jesuits the *Ratio Studiorum* was followed, which, because it was not modified to meet the demands of the people, became one cause of the expulsion of this order (1772). Their property was seized by the State, and their schools reorganized as State institutions, to be conducted according to official regulations (1773). When expelled the Jesuits were maintaining 37 gymnasia. Schools of a similar grade were also conducted by the Piarists (*q.v.*) (24 in number), by the Benedictines (*q.v.*), and other religious orders. The Latin language had been used almost exclusively in the Jesuit schools for both speaking and writing. The Piarists followed, in general, similar methods, but they also gave attention to Greek, German, history, geography, mathematics, and physics.

The organization of the gymnasia adopted by the State was similar to that of the Piarist schools, and the course of study practically the same. The principal aim of the grammar classes was to teach the pupils to speak Latin with correctness, an accomplishment of first importance for clergy and diplomats. No important changes in the general regulations for the state gymnasia were made until 1805, when the *Constitution of the Austrian schools* was adopted. The regulations therein embodied increased the number of classes to 6 and required as many teachers as classes. The hours of study were limited to 18 a week, and were divided as follows: 9 hours a week to the subjects of geography, history, mathematics, natural history, and physics in the three lower classes; 9 hours a week to Greek, in the three upper classes; while 9 hours a week were devoted to Latin throughout the course. The speaking of Latin was required in the third and higher classes. Improved textbooks were issued, with instructions respecting their use.

The establishment of gymnasia was encouraged by wealthy communities and cities, and also by the religious orders, so that the number of the schools gradually increased; in 1818 there were altogether 82 secondary schools, public and private.

No further attempts toward a reorganization of the gymnasia were made until 1849. The regulations then adopted separated the philosophical course from the higher department, and united it with the humanity classes to form the upper gymnasium (*Obergymnasium*), from which the lower gymnasium (*Untergymnasium*) was distinct in gradation. The course of study was extended to 8 years. The gymnasia are still conducted according to these regulations. The same law (1849) recognized the realschulen and regulated their organization. The subjects of study and the extent of the course were unsettled questions until 1869, when a new law, defining the course of study, was enacted. This law, which is still in force, prescribed a course of study for 7 classes, or years. Another class of secondary schools, closely related both to the gymnasia and the realschulen, are the realgymnasia, which were first opened in 1864, but not officially recognized until 1869, when regulations were enacted prescribing the course of study. This class of schools is intended for students who do not expect to enter either the university or the higher technical schools, but the training they give admits to the higher classes of both the gymnasia and realschulen.

The relation between these three classes of schools is indicated by the following tabular view of their curricula.

GYMNASIUM (8 YRS.)	TOTAL NUMBER OF HOURS	REALSCHULEN (7 YRS.)	TOTAL NUMBER OF HOURS	REALGYMNASIUM (4 YRS.)	TOTAL NUMBER OF HOURS
Religion	680	Religion	320	Religion	320
Latin	2000	German language and literature	960	German	480
Greek	1120	French	920	Latin	1120
German		English	280	Greek	320
Mother tongue	1000	History and geography	960	French	240
History and geography	960	Mathematics	1160	History and geography	560
Mathematics	920	Natural history and physics	1120	Mathematics	480
Natural history and physics	760	Chemistry	440	Natural history and physics	420
		Geometrical drawing	960	Chemistry	60
		Freehand drawing	960	Geometrical drawing	560
		Penmanship	80	Freehand drawing	

The administration of secondary schools is vested, first, in the ministry of instruction; second, in an inspector for the schools of each crown land; third, in a local board. Church and private schools are subject to the same regulations as state schools. The public gymnasia (including realgymnasia) and realschulen are maintained either by the State, the crown lands, or the cities. A majority of them, however, are maintained by the State. Private gymnasia derive their maintenance from subventions and from ecclesiastical foundations. A small tuition fee is charged in these schools. The number .of state and private gymnasia in 1908–1909 was 267, with 91,267 students. The languages of instruction used in these schools was as follows: German, 127; Bohemian, 53; Polish, 56; Italian, 6; Ruthenian, 7; Serbo-Croatian, 6; mixed languages, 12. During the same year there were 141 realschulen, with 46,374 students.

The teachers are trained at the universities and at the teachers' seminaries. After 8 years' teaching service they are entitled to a pension, which after 30 years amounts to full salary. The number of teachers in the gymnasia in 1905–1906 was 5329 and in the realschulen (1905–1906) 2817. In every school there must be a library containing books suitable for both teachers and students. The teachers of a district must meet for conference once a year, and all those of a province must meet once in 3 years.

Trade Schools (Fachschulen).—Trade schools were established originally in the larger cities and towns for the purpose of encouraging home industries. Within the last quarter century they have been opened in all parts of the empire, and the trades taught conform, as far as possible, to local demands. The course of instruction therefore varies, requiring, however, about the same time, *i.e.* from 2 to 4 years, for completion. In every school a certain number of hours each week is devoted to commercial education, bookkeeping, shorthand, commercial arithmetic, drawing, and design. The school hours are from 8 to 12 in the morning and from 2 to 6 in the evening. Pupils must have completed the course of study in the elementary schools before entering the trade school. The tuition is from 2 to 5 crowns a term. The great variety of schools indicates the range of industries for which Austria is noted. They include schools for weaving, stone cutting, jewelry, stone setting, cabinet work, basket making, glass making, pottery, and other trades. About 150 fachschulen are subject to state supervision, and of these 70 receive state aid. Closely related to the trade schools for men are the lace schools for women. These are under the direction of the central lace school of Vienna, which is also a training school for teachers. In 1905 there were 30 such schools.

Besides the class of trade schools named there are high schools for arts and crafts (*Höhere-Gewerbeschule*), foremen's schools, for those who have had experience in some trade, general artisans' schools, which give a better preliminary training than the pupils can get in the public school, and continuation schools. The last-named schools are conducted evenings and Sunday morning, and are attended by apprentices and artisans. They number above 800, many of which are subsidized by the government.

The total number of industrial schools in 1905 was 1274, with 127,400 pupils.

Commercial Schools. — Commercial education received a new impulse upon the reorganization of the Vienna commercial academy in 1873. Since then similar academies have been established by communes, chambers of commerce, and private corporations in different parts of the empire. Many of these schools are granted a subvention by the State, and are under the control of the ministries of Public Instruction and Commerce (since 1888). There are academies which offer advanced commercial training, and commercial schools which prepare for office and ordinary business affairs. The course of study in all commercial schools comprises geography, arithmetic, writing, phonography, and German, while in the academies it includes foreign languages, mathematics, geometry, physics, commercial law, and chemistry.

In 1905 there were 272 commercial schools, with 29,300 students. The language of instruction (*Unterrichtssprache*) in these schools varies: 185 use German; 60 use Czech; 5, Polish; 6, Italian; and 16, mixed languages.

Higher Education. — The institutions for higher education may be divided into two classes: universities and professional schools, and higher technical schools.

Universities. — There are 8 universities in Austria, the oldest of which, the University of Prague, was founded in 1348 by an imperial charter issued by Charles IV, which provided for four faculties, theology, medicine, arts, and law, with a rector at the head of each faculty. In 1370 the law faculty was separated from the university, and for a time regulated its own affairs as a separate university.

The students were granted a voice in the administration, and to this end the student population was divided into four nations: Bohemia, Poland, Bavaria, and Saxony, an organization which had formal recognition down to the nineteenth century. The heads of these nations sat in the council which regulated the affairs of the university. Prague soon attracted students from all parts of Europe, and especially those of the German and Bohemian nationalities. As a consequence the political and religious differences of the Teutons and Czechs invaded the university life, much to its detriment. The quarrel was ended by the withdrawal of the German students (estimated at 5000), in 1409. As a consequence Prague suffered a decline, and for nearly two centuries was represented by the single faculty of theology. In 1793 a chair of the Bohemian language and literature was founded. From this small beginning the use of the language rapidly increased, and an intense rivalry grew up between the Bohemian and German students. The difficulties were finally adjusted in 1881 by the creation of a Bohemian university coequal with the old institution.

The University of Vienna was founded by a charter issued by Rudolf IV in 1365, the constitution being similar in many respects to that of Prague. After the decline of Prague (1409) Vienna attracted a great number of students and was soon at the head of all the German universities. For more than a century it has been distinguished particularly for its school of medicine. With the single exception of Cracow, as will be seen by reference to the table below, none of the remaining universities was founded before the sixteenth century.

The universities are subject to the Ministry of Instruction, but enjoy a high degree of autonomy. The internal affairs are regulated by rectors and by the deans of the faculties. They are maintained by fees and annual appropriations from the State. The number of professors and instructors in each faculty and the number of matriculates are shown in the following table: —

NUMBER OF STUDENTS AND TEACHERS, 1907–1908

Universities	Date of Foundation	Theology		Law		Medicine		Philosophy		Total		Volumes in Library
		Instructors	Students	Instructors	Students	Instructors	Students	Instructors	Students	Instructors	Students	
Cracow (Polish)	1364	7	80	17[2]	1004	45	440	55	1043	124	2567	390,000
Czernowitz (German)	1875	10	127	18	473		17[1]	30	217	834	834	180,800
Gratz (German)	1586	12	88	20	952	45	365	61	658	138	2063	235,500
Innsbruck (German)	1672	17	338	12	272	25	192	45	314	99	1116	224,000
Lemberg (Polish)	1784	13		26		42		60		141	3756	191,263
Prague (German)	1348	11	70	16	714	61	305	65	629	153	1718	354,350
Prague (Bohemian)	1881	10	126	29	1724	58	551	83	1510	180	3911	
Vienna (German)	1365	14	214	64	3260	232	1500	192	2664	502	7638	731,000

Professors receive a salary from the State, the honorarium having been abolished in 1896. They are appointed by the Minister of Public Instruction upon recommendation of the faculty in which the vacancy exists.

There are independent theological faculties at Olmütz (founded as a university in 1581, but suppressed in 1853), at Salzburg (founded in 1623, but deprived of secular faculties in 1815), and at Vienna. These faculties, which in 1907 comprised 350 students, rank with those of the universities.

Technical Education. — State technical schools are located at Brünn, Gratz, Lemberg, Prague, and Vienna. The school at Prague was established as early as 1806, and the school at Vienna in 1815. The principal courses of study are chemistry, electrical and mechanical engineering. These schools rank with the universities. The following table shows the number and distribution of the teachers and students in 1907–1908.

Technical High Schools	Teachers	Students	Volumes in Library
Brünn (German)	94	613	27,600
Brünn (Bohemian)	70	439	10,035
Gratz	43	703	
Lemberg	56	1629	14,050
Prague (German)	74	1030	
Prague (Bohemian)	118	2541	
Vienna	180	2998	103,425
Vienna (Agriculture)	60	772	26,000

In addition to the above-named institutions, there are many technical schools, of an inferior order or narrower scope, training pupils for special industries; in particular for mining, agriculture, and forestry. In 1906 the agricultural and forestry schools numbered 190, with 8000 pupils.

Academies and Societies. — Study and investigation is encouraged by academies and societies, some of which are subsidized by the State. Located at Vienna are the Royal Academy of Science, founded in 1847, the Anthropological Society (1870), with 450 members, and the Royal Geographical Society (1856), with 2000 members and a library of 8000 volumes. At Prague are the Bohemian Academy of Science, Literature, and Art (1890), and the Royal Bohemian Society of Science (1770), the latter having 230 members and a library of 30,000 volumes. A Royal Academy (Polish) is located at Cracow, and a Society for the Advancement of Polish science at Lemberg. L. D. A.

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[1] Greek and Oriental Theology.

[2] Pharmacy.

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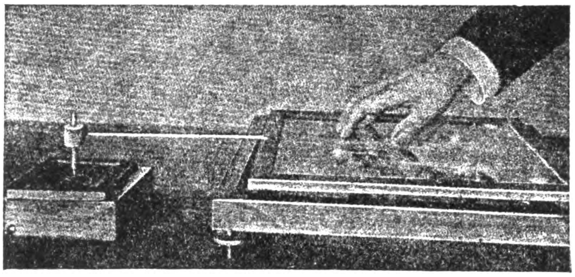
AUSTRIAN METHOD OF SUBTRACTION. — See Subtraction.

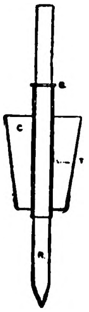
AUTO-. — A general prefix which indicates any process initiated by the individual without external interference; such as autohypnosis. See Self-Instruction.

AUTOMATIC MOVEMENT. — Certain movements of the body are executed without deliberation or choice. Thus one winks when any object moves rapidly toward the eyes; one throws out his hands to protect himself when falling forward. Such activities as these are due to an organized nervous mechanism, which was either inherited or has been so completely perfected through long use as to be entirely beyond the control of consciousness. Automatic activities are of the same general type as reflexes (*q.v.*). The distinction which is sometimes drawn between the two terms is that reflexes are regarded as somewhat simpler than automatic movements. Topics which should be consulted in the same connection are instinct and habit. The importance of distinguishing automatic movement in any educational discussion is that the complete perfection of a movement relieves consciousness so that attention may turn to the other phases of the situation and not be drawn to the details which would guide the movements. C. H. J.

AUTOMATISM. — Refers to forms of activity which arise in response to internal stimulation. These internally initiated forms of behavior are very frequently due to circulatory stimuli acting directly on the nerve centers, or to toxines contained in the blood.

See Somnambulism.





The Automatograph. — When in use a screen (not shown in the illustration) cuts off the view of the apparatus from the subject. The recording device, which may also be used separately, is shown in outline in half its full size. R is a glass rod which moves freely up and down in the glass tube T, which is set into the cork C. A rubber band B is provided to prevent the rod from falling through the tube, when not resting upon the recording plate.

AUTOMATOGRAPH. — An apparatus for the study of involuntary movements. One type is exhibited in the figure. For further discussion of records see Mind Reading.

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AUTOMATON THEORY. — The physiological processes which are involved in reflex action (*q.v.*) seem to operate without any reference to conscious choice. The mechanism is accordingly said to constitute an automaton. When all action is reduced to reflex activity, as it is by some students of human behavior, the body is treated as an automaton, and no place is left in the theory of such writers for the recognition of consciousness as a cause. Consciousness is merely an added phenomenon without influence in determining bodily action. The automaton theory is not necessarily opposed to the principle that education can modify individual character. Even reflex activities can be modified through use and through fluctuations in external stimuli. The body could be influenced in its development quite apart from the training of consciousness. The automaton theory, however, lays greater emphasis upon habit and reflex activity than upon the opposite, which may be described as freedom of choice and conscious control. For further discussion of this matter see Will. C. H. J.

AVENTINUS, JOHANNES (1477–1534). — A Bavarian humanist, so called from his birthplace, Abensberg; his real name was Turnmair. He was author of the first Latin grammar which was (partly) written in German, and published in Munich in 1512. (Cf. Raumer's *Geschichte der Pädagogik*, Vol. III, p. 108.)

AVERAGE. — See Graphic Curve.

AVERAGE MEMBERSHIP. — A term used in educational statistics, which, however, yet lacks standardization. Total enrollment (*q.v.*) and average daily attendance are also used as measures of school attendance, but are respectively too large and too small to be satisfactory measures to the end of school accommodation. The pupil is a member of a school, or technically belongs, as long as he has not removed or been absent too long to preserve his claim to his seat. In some states after 5 days of unexcused absence the pupil ceases to be a member; in others the number is 3. In some cases the pupil technically belongs even after some weeks of absence, if that be necessary owing to sickness. The consequence is that whereas the signification of the measures total enrollment and average daily attendance are practically uniform, that of average membership is not. D. S.

See Attendance.

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AVERAGES. — See Graphic Curve; Statistics.

AVERROËS, ABU'L WALID MOHAMMED. — The son of Achmet, the son of Mohammed, the son of Rushd; born at Cordova, in Spain, in 1126. Few men have exerted a greater influence upon the course of the thought of the Western world. His sire and grandsire had been eminent in jurisprudence, and his own studies proceeded from theology and canon law to philosophy and medicine. His talents procured him an appointment to expound Aristotle to the Khalif Abu Yakub Yusuf; and he is heard of also as a judge at Seville and Cordova. The rationalism of Averroës was, however, his undoing, and in 1195 his fanatical enemies caused him to be banished to a Jewish settlement at Lacena. Restored after two years to safety and the royal favor of Khalif Yakub al-Mansur, he died shortly afterwards, on Dec. 10, 1198, in Morocco, leaving a family of several sons.

Averroës is the great master in the history of Mohammedan philosophy, and it was only due to the victory of orthodox Moslem fanaticism that his successors were compelled to come from Christendom rather than Islam. In Averroës the pure philosophy of Aristotle was almost entirely freed from the persistent mystical influence of Neo-Platonism. Averroës was the great commentator whom Dante and the medieval thinkers could not regard entirely as a heathen. His work was the medium whereby a great part of the lost work of Aristotle was restored to the civilization of western Europe. His debt to earlier Hebrew philosophy and his influence upon subsequent Hebrew speculation were perhaps equally great. The first greeting of the writings of Averroës and Aristotle in Christendom took the form of persecution; but through the genius of Albertus Magnus (*q.v.*) and Thomas Aquinas (*q.v.*) the dangerous tenets were molded to the support of orthodoxy. It appears to be true that the first complete infidelity, or skepticism, indeed, the first complete rationalism, which entered the fold of Christendom crept in with the fearless criticisms and impartial theological judgments of the famous Moor.

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AVICENNA (ABU ALI EL-HOSSEIN IBN-ABDALLAH IBN-SINA). — Born about 980 a.d. at Efsene, in the Bokhara region. His father, a tax collector, removed to Bokhara, and appears to have given the son an excellent education, an advantage which was appreciated to such a degree that the boy was the marvel of all who knew him. In medicine and philosophy he surpassed all others, even in a region then famous for these studies. At 17 he became court physician, utilized the library of the Emir, and on his father's death proceeded upon travels which closed with an appointment as Vizier to the Emir of Hamadan. Driven thence by a mutiny of the troops, he continued to study and teach in secret, until discovered and imprisoned by a new Emir of Hamadan. Escaping in disguise, Avicenna found security and honor at Ispahan, acting as court physician, studying and writing, yet leading a life of oriental pleasure and excess. His complex career was terminated in June, 1037.

The importance of Avicenna to Western thought lies in the fact that his work, based largely on Galen and ultimately Hippocrates and Aristotle, became the great medical textbook of the medieval universities. His system of medicine, *Kanun fi'l Tibb*, carries minuteness of classification of bodily ailments to an extreme, but is inferior in the parts which deal with surgery. His canon only lost its hold on the Western universities in the seventeenth century. The philosophical works of Avicenna are characterized by an attempt to combine religion and philosophy in a consistent system, and were not without influence upon Albertus Magnus (*q.v.*) and the later scholasticism.

AXIOM. — A term used in mathematics to indicate a general assumption agreed to by all. Euclid (*q.v.*) used the expression "common notions" (*κοιναὶ ἔννοιαι*), but his commentator Proclus (*q.v.*) uses "axiom" (*ἀξίωμα*), and this name has replaced the older one. The distinction between an axiom and a postulate is not always clearly set forth in the works of the Greek geometricians, but in Euclid it is quite evident. A postulate (*αἴτημα*) is a request made by a teacher to his pupil, or a concession by the latter, that some proposition may be granted without proof, as a basis upon which the particular science in question (in Euclid's case, geometry) may be built. An axiom is a demand of a more general nature, also relating to basal principles, and commonly assented to by every one. Thus it is an axiom that quantities that are equal to the same quantity are equal to each other, — a generally accepted truth in all mathematics, at least with slight modifications or explanations. It is a postulate that through a point only one line can be drawn parallel to a given straight line, for this is an assumption peculiar to geometry, and is by no means as generally agreed to as the axioms. Indeed, this particular postulate may be denied, and a contradictory one substituted for it, as was done in the works of Lobachevsky (1793–1856) and Bolyai (1802–1860), resulting in the "non-Euclidean geometry." The postulates of Euclid were 5 in number, and the "common notions" (axioms) were also 5, the latter having been supplemented by various commentators. D. E. S.

AXIS CYLINDER. — See NERVOUS SYSTEM.

AZARIAS, BROTHER. — See MULLANY, PATRICK FRANCIS.

AZTECS, SCHOOLS OF. — See MEXICO, EDUCATION IN; PRIMITIVE SOCIETY, EDUCATION IN.

BABYHOOD. — See CHILD STUDY; CHILD PSYCHOLOGY.

BACCALAUREUS. — There can be no doubt that the numerous derivations assigned to this word hitherto were fanciful. It is now well established that the word *baccalaureus*, or *baccalarius*, was derived from the Low Latin *bacca* (for *vacca*), and was a term applied to a cowboy or herdsman serving under a farmer. Young warriors who were not yet knights were also called bachelors. Clearly it denoted one who was serving an apprenticeship. As used in connection with the universities of the Middle Ages, the term was applied to a student who, while still pursuing his studies under a *magister*, was permitted to lecture or prepare other students. This interpretation brings the medieval universities into line with the guild organizations of the period. Before a student could become a master, or obtain the license to teach, he had to serve a term of apprenticeship. The period of apprenticeship began in the earlier universities at the end of a 5 years' course of study. Later, when the "arts faculty" came to be recognized as part of the university, the period began on the completion of the study of the *trivium* (*q.v.*). Although there was nothing in the nature of an examination, the candidate for the title had to go through a ceremony or "determination," an imitation of the disputation of the masters. Admission to the bachelor's degree belonged either to the proctors (Paris), the rector (Bologna), or to the Chancellor (Oxford). At Paris an *Examen Baccalariandorum* was introduced about 1275, and was conducted by a board of examiners, who decided whether a candidate might be admitted to determine. After the institution of the examination the baccalaureate became an inferior degree.

See article on DEGREES.

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BACCHANTS (*Baccantes* from *vagantes*, "wanderers"; also referred to *Bacchus*). — The wandering student of the late Middle Ages. The term was usually applied to the students of grammar and rhetoric, who led a roving life, visiting the various church, monastic, or burgher schools, usually accompanied by smaller boys (see SHOOTERS), who were nominally apprenticed to them, until in time a permanent place was found, when the bacchant became a *locatus* (*q.v.*). The wandering priests (*clerici vagantes*) had formed a feature of the life of the Church from the fifth century, at least. With the founding of the early universities, the wandering scholars became a class distinct from the wandering priests, though many of the scholars were in orders, and most of the remainder aspired to be. Those who adopted the wandering life as a definite mode of living as distinguished from those who simply sought to follow the most attractive teacher were called *Goliards* (*q.v.*). By the fourteenth century these Goliards had sunk in popular esteem, and they tended to fuse with other wandering classes, as the minstrels. But with the growth of a more extensive system of grammar schools throughout Europe during the Renaissance period a younger group of migrating students grew up, — the bacchants, — in time to become a social nuisance and an educational perversion. It became one of the aims of the Protestant reformers to suppress this class. The development of state systems of schools giving uniform opportunities in almost every locality made this possible. However, the migrating teacher (see BOARDING ROUND OF TEACHERS) continued in Teutonic lands as a survival. Two classic accounts of the wandering scholars have been left, the Autobiographies of Thomas Platter (*q.v.*) and of Johannes Butz-Bach (*q.v.*). See Symonds, *Wine, Women, and Song.*

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BACHE, ALEXANDER DALLAS (1806–1867). — Educator and author, was born in Philadelphia July 19, 1806. He was graduated from the United States Military Academy at West Point in 1826, and for 2 years was an instructor in that institution. For 8 years (1828–1836) he was professor in the University of Pennsylvania. Having been elected president of Girard College, he was sent by the board of trustees of that institution to Europe for 2 years that he might study the educational systems of the old world. During this interval he visited all the countries of western Europe, and came to know with a good deal of intimacy their educational institutions. His *Report on Education in Europe* (Philadelphia, 1839, 666 pp.) was the earliest comprehensive account of European school systems published in America, and certainly no account has ever since been published that covers the same ground so well. While in Europe he visited 278 different institutions, including practically every class, from the elementary schools to the higher seats of learning, and including schools for defectives, dependents, and delinquents, as well as technical and industrial institutes. He was president of Girard College until 1841, when he accepted the principalship of the Central High School at Philadelphia. From 1843 to 1847 he was superintendent of the United States Coast Survey. He was one of the incorporators of the Smithsonian Institution (*q.v.*) and the American Association for the Advancement of Science (*q.v.*) and was active in the organization of the National Academy of Science (*q.v.*) and its first president. He was an advocate of school athletics and other forms of physical training, and was keenly interested in the education of women. His report (1840) on *A High School for Girls and a Seminary for Female Teachers,* which was widely reprinted, aided greatly the cause of the higher education of women. His published essays include 150 titles, many of which are on education. He died Feb. 17, 1867. W. S. M.

BACHI, PIETRO (1787–1853). — Teacher of foreign languages, educated in Sicily and at the University of Padua. He was for 20 years instructor in Italian and Spanish at Harvard College, and the author of a series of college textbooks on these two languages. W. S. M.

BACKWARD PUPILS. — Children who do not progress from grade to grade according to the normal rate of the school system, and who constantly require special assistance in the classes in which they are enrolled, are called " backward," " over-age," or " retarded " pupils. Bright pupils, slightly and temporarily retarded, because of illness, necessary absence, transfer from one school system to another, or other circumstantial causes, are not, strictly speaking, " backward pupils." The " backward " child is caused by physical or mental defects of a congenital type, or by family neglect, irregular school attendance, and inefficient modes of instruction. Various devices, particularly the ungraded class, have been utilized to relieve the regular graded classes of the burden of the " backward " child and to make it possible for such " over-age " children to get the special attention they require.

H. S.

See RETARDATION; also, GRADING and PROMOTION.

BACON, FRANCIS (1561–1626). — Baron Verulam, Viscount St. Albans; English philosopher, statesman, and man of letters. Bacon was one of the greatest lights of the brilliant age of Elizabeth, being, as he said, " two years younger than her Majesty's happy reign." He was a contemporary also of Elizabeth's successor, the pretentious pedant, King James. Shakespeare was 3 years Bacon's junior and was outlived by Bacon 10 years. Bacon did not highly esteem the profession of actor, saying " and though the thing itself be disreputable in the profession of it, yet it is excellent as a discipline; we mean the action of the theatre."

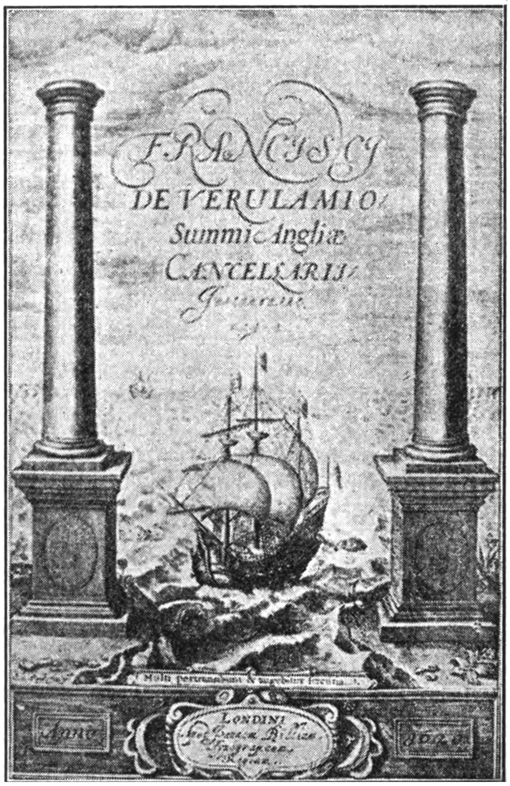
In his twelfth year Bacon went with his brother Anthony to Trinity College, Cambridge. After 3 years spent here, during which he came to dislike the philosophy of Aristotle as formal and profitless, he traveled in France as an *attaché* of the English embassy, gaining valuable experience. On returning to England, having but little means, he studied law, and became a barrister in 1582. Two years later he was elected to Parliament, where he displayed great ability, conceived high ambitions for political preferment, suffered from financial embarrassments, but profited politically and financially by the friendship of the Queen's greatest favorite, the brilliant Essex, and cherished his youthful purpose to renew science by showing to it both its true method and its grand mission. About 1592 he addressed a letter to his uncle, the prominent Lord Burleigh, asking for aid, and saying, among other things: " I confess that I have as vast intellectual ends as moderate civil ends; for I have taken all knowledge to be my province; and if I could purge it of two sort of rovers . . . (the frivolous disputers and the blind experimenters), I hope I should bring in industrious observations, grounded conclusions, and profitable inventions and discoveries; the best state of the province. This, whether it be curiosity or vain-glory, or nature, or (if one take it favorably) *philanthropia*, is so fixed in my mind as it cannot be removed."

The latter part of his political career was crowned with high honors, though shadowed by his prosecution of his friend and benefactor, Essex, for the crime of treason, and disgraced by the charge and confession, as Lord Chancellor, of bribery. In 1595, Bacon became Queen's Counsel; in 1607, under James, Solicitor-General; in 1613, Attorney-General; in 1617, Keeper of the Great Seal, as his father before him had been; in 1619, Lord Chancellor, with the title of Baron Verulam; in 1620, Viscount of St. Albans. Concerning the two notable charges against his character, his so-called treachery to Essex and his being guilty of bribery, it may in justice be remarked that the rash Essex had indeed been guilty of treason in championing the Scottish succession, and Bacon as the Queen's Counsel simply did his official duty in a difficult situation, though perhaps with unbecoming zeal. As to the bribery, it was common in those days for litigants to make presents to the judges, and it was not common to take notice of it. Bacon himself fairly observes: " I was the justest judge that was in England these fifty years; but it was the justest censure that was in Parliament these two hundred years." He also maintained that the bribe had never been in his eye when he gave judgment. But he was stripped of his offices, though allowed to retain his titles by a small vote, and Pope, with stinging satire, could write: —

> " If parts allure thee, think how Bacon shined ;
> The wisest, brightest, meanest of mankind."

During his busy public life Bacon had used his leisure moments in writing. After his fall, some six years of feeble health were devoted to the same purpose. His death came from catching cold, while experimenting on the preservative properties of snow. His writings show the flexibility of the newly formed English language; they are very quotable, despite the heaviness of the thought and the compactness of the style; and they are very comprehensive and remarkable, making epochs, in fact, in literature, in science, and in philosophy. Though anticipating much of modern progress, Bacon did not anticipate the future of the English language. Conforming to the Renaissance custom of the time, he either wrote in, or else translated into, Latin all his main works.

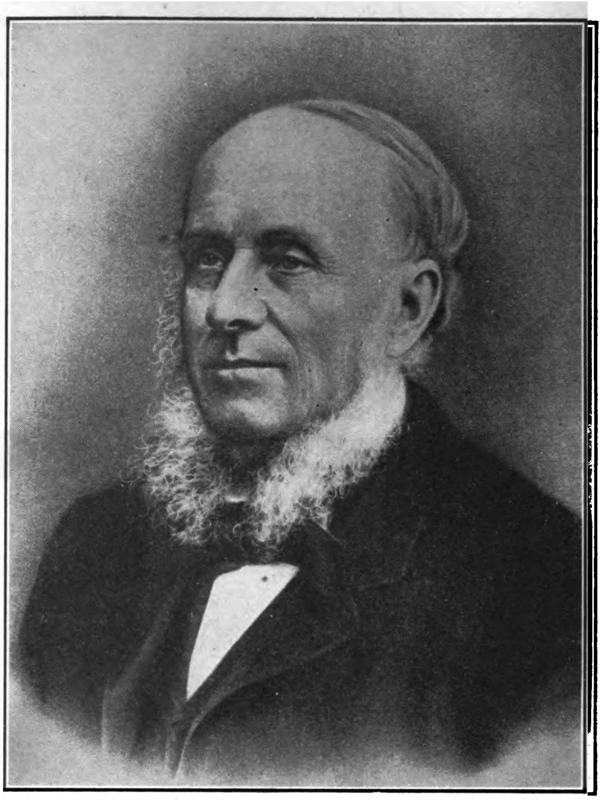
Bacon had a vast plan in his writings, which he was not able fully to execute. The plan was called the *Magna Instauratio*, the Great Renewal. In short, the *Great Renewal* meant that the new object of knowledge is not words, but nature; the new source of knowledge is not pure reason, but the senses; the new method of knowledge is not deduction, but induction; and the new aim of knowledge is not discipline, but power. The first part of the *Magna Instauratio* was published in 1605, and was entitled *Of the Proficience and Advancement of Learning.* This work refutes the objections to learning, and distributes knowledge into the three main divisions of history, poesy, and philosophy, thus making " a small globe of the intellectual world " and exhibiting its undiscovered countries. He rang the bell, as he said, to call the wits together. The second part of the *Magna Instauratio* appeared as the *Novum Organum* in 1620.



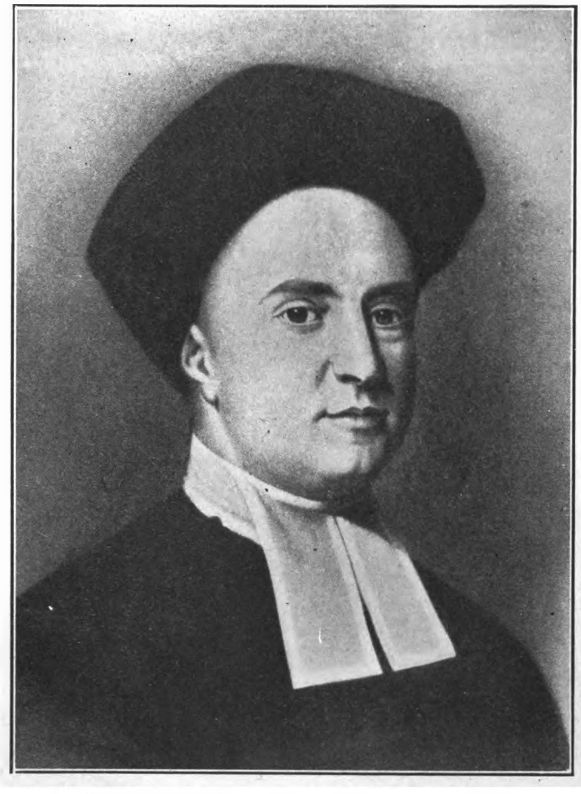
Title page to *Novum Organum* (1620).

In the short preface to this work he contrasts " the method of cultivating the sciences," " the anticipation of the mind," with " the method of discovering the sciences," " the interpretation of nature." In sum, the one is deduction, the *Organum* of Aristotle; the other is induction, the *Novum Organum* of Bacon. The first aphorism of Book I gives the animating spirit of the whole: " Man, as

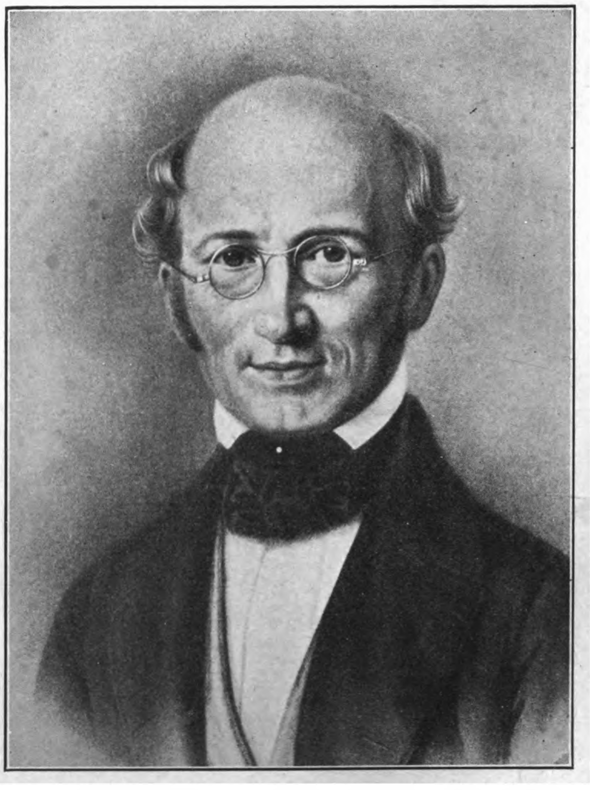
Francis Bacon (1561–1526). (See p. 313.)



Alexander Bain (1818–1903). (See p. 318.)



George Berkeley (1684–1753). (See p. 365.)



Frederick Eduard Beneke (1798–1854). (See p. 362.)

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the minister and interpreter of nature, does and understands as much as his observations on the order of nature, either with regard to things or the mind, permit him and neither knows nor is capable of more." Yet, Bacon admitted revelation to be a source of knowledge and a basis for religion. The famous "idols" appear in this piece. The third part of the *Magna Instauratio* is represented by the *Sylva Sylvarum*, together with some minor works. This part attempts to present the data of the universe as phenomena for induction, to provide an "experimental history of nature." It shows the range of Bacon's knowledge, his moderate capacity in handling induction, his failure to appreciate the element of risk that enters into every inductive leap of the understanding, his consequent excessive caution in generalizing, and his undue depreciation of deduction. The three remaining parts of the *Magna Instauratio* were unfortunately never completed.

Among the other writings of Bacon possessing particular educational significance are the unfinished *New Atlantis*, and certain of the ever living *Essays*. The *New Atlantis* is another one of the Renaissance Utopias, concerning which Bacon's first editor, Wm. Rawley, says: "This fable my lord devised, to the end that he might exhibit therein a model or description of a college, instituted for the interpreting of nature, and the producing of great and marvellous works, for the benefit of men; under the name of Solomon's House, or the College of the Six Days' Works." In truly modern fashion Bacon describes "Solomon's House" as an investigating university, science appearing as the civilizing agency in the ideal society, binding man to man, and also leading man to God.

The *Essays or Counsels Civil and Moral* were written and rewritten at intervals from 1597 to 1625. They provide that analysis into elements of the inner life of man which his inductive philosophy requires of the outer life of nature. Many of these counsels are excellent, some in Machiavellian fashion separate politics from ethics, and all are shrewd and suggestive. Of particular educational moment may be mentioned those entitled: "Of Parents and Children," "Of Travel," "Of Regimen of Health," "Of Custom and Education," "Of Gardens," "Of Studies." These essays were so purely distilled in the retort of Bacon's analyzing thought that they cannot be summarized, and perhaps quotations that might be made from them are already in the mind of the reader.

Bacon rarely discussed specific educational questions. The more interest attaches to certain views of his on the "Arts of Teaching" that appear in Book VI, ch. iv, of the *Advancement of Learning*. We there learn that education, according to Bacon, should go on in colleges and not wholly in private houses and schools; that too concise methods, too hasty opinions, are to be avoided, which "rather make a show of improvement than procure it"; that there are two ways of exercising genius, from the easy to the hard and from the hard to the easy, "for it is one method to begin swimming with bladders, and another to begin dancing with loaded shoes"; that "excursions of genius are to be somewhat favored"; that "the suiting of studies to the genius [ability] is of singular use"; that "everyone makes greater progress in those studies whereto he is naturally inclined"; that "there are certain remedies in a proper choice of studies for particular indispositions of mind," *e.g.* he recommends mathematics for inattention; and that exercises should be varied in character to prevent the fixation of faults. These definite views on teaching hardly surpass the customary principles advocated by the Renaissance educators. In fact, they rather indicate that Bacon paid only casual attention to teachers and teaching.

This conclusion is borne out also by the repeated and undiscriminating praise he accords the Jesuits. In this same chapter he says, "For the doctrine of school-learning, it were the short way to refer it to the Jesuits, who in point of usefulness have herein excelled." In the first book of the *Advancement of Learning* he writes, ". . . the wisdom of the ancientest and best times always complained that states were too busy with laws and too remiss in point of education. This excellent part of ancient discipline has in some measure been revived of late by the colleges of Jesuits abroad; in regard of whose diligence in fashioning the morals and cultivating the minds of youth, I may say, as Agesilaus said to his enemy Pharnabasus, *talis quam sis, utinam noster esses*." Shall we say that Bacon had not worked out carefully the bearings of his own fundamental principles of investigation, of induction in science, upon education, or that he simply, reflecting a popular opinion, misunderstood what the Jesuits were doing, since Jesuitic and Baconian results are mutually contradictory, or perhaps that both alternatives are true? The man who did see the application of Bacon's philosophy to education was Comenius (*q.v.*).

In sum, the educational influence of Bacon was general rather than specific; he discovered a mine that has enriched modern thought, life, and civilization, but he was unable to work out all its veins; his immediate service is to education in the broad sense of the term rather than to the school. Thus, broadly speaking, Bacon initiated the greatest reform movement in education following the Renaissance, viz. "sense-realism." His followers reconstituted the curriculum and revolutionized school method. He destroyed the reign of authority in science; he helped to make modern science and modern philosophy possible; he substituted nature for dialectic disputation; he considered the narrow humanism of Ascham and Sturm to be "the first distemper of learning, when men study words and not matter"; he substituted induction for deduction in the study of nature, thus giving education the sense basis; and in the spirit of philanthropy he started the ideal of pansophism (*q.v.*), that all knowledge might be unified for dissemination among men. These wonderful innovations were not effected without the assistance of the scientific geniuses and the practical schoolmasters of the period, such as Bruno, Copernicus, Da Vinci, Galileo, Kepler, Grotius, Boyle, Mulcaster, Ratke, and Comenius. But Bacon was the philosophical inspiration of the modern scientific movement. His greatness consists in his formulation of the scientific problem, his provision of the means for its solution, and his now fulfilled prophesies of the results. Bacon has provided the mottoes for modern contributions to universal scholarship, from Kant to Sandys.

Of the epoch-making character of his work he was very well aware, finding comfort in the fruits to come from the travail of his mind. He wrote: "I have held up a light (Induction) in the obscurity of philosophy which will be seen centuries after I am dead. It will be seen amid the erection of temples, tombs, palaces, theatres, bridges, making noble roads, cutting canals, granting multitude of charters and liberties for comfort of decayed companies and corporations; the foundation of colleges and lectures for learning and the education of youth; foundations and institutions of orders and fraternities for nobility, enterprise, and obedience; but, above all, the establishing good laws for the regulation of the kingdom, and as an example to the world." H. H. H.

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BACON, ROGER (*c.* 1214–1294). — This monk was the most profound thinker and perhaps the most learned man of the thirteenth century. Probably under the influence of Grosseteste (*q.v.*), one of his teachers, he joined the Franciscan Order. He studied at Oxford and in Paris, and returned to England about the year 1250. In 1257 he was sent back to Paris, and was twice put under restraint. At the end of the first period (1267) he composed for Pope Clement IV his great works, the *Opus Majus,* an encyclopedic treatise on all the learning of his day; the *Opus Minus,* in which he discusses the obstacles of learning in his day, and the varying and various versions of the Scriptures; and the *Opus Tertium* which deals with many scientific, philosophical, grammatical, and philological questions. To those works we must add the *Compendium Studii Philosophiae,* the *Compendium Studii Theologiae* (1292), his Greek and Hebrew grammars, and many still unprinted works. He seems to have died at Oxford in 1294.

Bacon is important in the history of education as, from the point of view of general culture, marking the high watermark of medieval intellectual activity, and as an uncompromising critic of the methods of education in his own times. Dr. T. A. Walker, in his chapter on Education in Vol. II of the *Cambridge History of English Literature,* deals with the first point. He says: "The glory of the Grey Friars culminated in Roger Bacon (*c.* 1214–1294). Skilled in all the recognized studies of his age, he, in opposition to prevailing ideas, though remaining a schoolman, pointed to the study of languages and mathematics as affording the true basis for a sound system of education, and incurred amongst his contemporaries and succeeding generations the lasting suspicion of tampering with the illegitimate by leading the way in the pursuit of natural science." A leading spirit in the universities of Paris and Oxford, he was of course intimately familiar with the intellectual needs of his age; and it is important to realize that he was essentially a forerunner of the Renaissance in England, and not only of the classical Renaissance, but of that other aspect of the Renaissance, the philosophic and scientific Renaissance, which began to extend the horizon of English thought in the seventeenth century. His activity in the sphere of education was precisely of the same nature as his activity in other directions — in the directions of pure thought, of pure scholarship, of natural science. An infinitely greater thinker than his later namesake, Francis Bacon (*q.v.*), he had the same universality of mind, the same desire to provoke a divine discontent in the minds of men, the same determination to go back to reality and to sweep away the shams and unrealities of current intellectual life. That he did much for that life is shown by the fact that his textbooks and treatises steadily circulated in England up to the very eve of the Reformation. His views can be well illustrated by his educational efforts. He and the scholars that he gathered together had a great influence on educational thought. We may rightly attribute to his influence and the memory of his work the remarkable provisions made by the Council of Vienne in 1311 for the teaching of Hebrew in the universities of Oxford, Bologna, Salamanca, and in the Roman schools. His work on arithmetic was circulating as late as the fifteenth century, his *De Caelo et Mundo* was in the library that Humphrey Duke of Gloucester gave to Oxford in the next century, his *De Grammatica,* his Greek Grammar, his

Hebrew Grammar, all had their place in the slow rebirth of European intellectual life. But he not only produced books for educational use. His mind was intensely critical as well as supremely constructive, and his attacks on the schoolbooks current in his own day show better than any other evidence his attitude to education and his lines of educational influence. Five writers of popular schoolbooks he literally slaughters, Papias, Hugutio, Alexander de Villa Dei, Neckam, and Brito. The first schoolbook in use in England after the Conquest was the *Elementarium* of Papias (composed about 1053 A.D.). Hugutio was Bishop of Ferrara from 1191 to 1212, and compiled a *Vocabularium* (which Johannes de Janua de Balbus used in conjunction with the *Elementarium* of Papias to form his *Catholicon* or *Summa*, which appeared in 1286). Alexander Neckam's *De Utensilibus* appeared before 1217, while Alexander de Villa Dei (*q.v.*) produced his *Doctrinale Puerorum* about 1209, a work that widely circulated in France and England. Bacon attacks most of these works. He violently attacks Alexander de Villa Dei's *Doctrinale Puerorum* (*Greek Grammar*, p. 121). So much for Bacon's criticism of schoolbooks. It is sound in every particular, and, if it did not save the schools from such books, it must have done much good in the universities. For the most part Bacon reserved his praise for Boethius, Bede, and Grosseteste, and he is never tired of preaching the need of Greek and Hebrew in intellectual life. The Latins, he declared, forgetful of Roman Law, "had not themselves originated a single branch of learning" (see *Greek Grammar*, Introduction, p. xvi). Bacon learned Greek from Greek teachers, and so, as did Reuchlin (*q.v.*) two centuries later, adopted the pronunciation known as *Itacism* "in distinction from the *Etacism* introduced by Erasmus." Though Bacon based his Grammar on Priscian, he does not hesitate to differ from him, if he disagrees. Thus he contradicts the assertion of Priscian that *Mi* cannot be the dative of *Ego* (*Opus Tertium*, lxi, p. 245).

"Bacon possessed the true philological instinct; he had a keen perception of the connection subsisting between the various dialects belonging to groups of languages. At a time when that study was as yet entirely unknown in Europe, Bacon speculated on the kinship of languages" (Hirsch) and endeavored to prove the existence of a universal grammar with accidental differences in particular cases. It was in such a spirit that he produced for the use of Latin scholars his Greek and Hebrew grammars. He regarded grammar (or, if the term might be used, culture) as the necessary antecedent of specialization in science (*Opus Tertium*, xxviii, p. 102), and in this anticipates much modern thought on education. The revival of Greek by Bacon is a stage in that fascinating subject, the history of Greek learning in England and Europe. In 668 Theodore and Adrian (*q.v.*) brought back Greek to England. Some of the scholars who survived into Bede's time, such as Tobias, Bishop of Rochester (d. 726) and Tatwine (d. 734) were as familiar with Latin and Greek as their mother tongue. Odo, Archbishop of Canterbury, who died in 961, carried on the Greek tradition. An examination of the early English Psalters and books of antiphone shows that Greek was used in parts of the services, in certain places at least, to the end of the Saxon period (see King Ethelstan's *Psalter* and the Winchester copy of the *Gloria* of the first half of the eleventh century). For the most part it is written phonetically, but we have a *Sanctus* in Greek uncials. This dwindling echo of Greek scholarship was given new life by Roger Bacon, who passed on the tradition to the days of the New Learning.

J. E. G. DE M.

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BACONE COLLEGE, BACONE, OKLAHOMA. — A coeducational institution established in 1880. The school, which has a campus of 160 acres, provides a 4 years' high school and freshman and sophomore college courses.

BACTERIOLOGY. — See BIOLOGY; BOTANY; HOUSEHOLD ARTS; MEDICAL EDUCATION.

BADEN, GRAND-DUCHY OF, EDUCATION IN. — See GERMAN EMPIRE, EDUCATION IN.

BAHNMAIER, JONATHAN FRIEDRICH (1841). — A German theologian, born in Obristenfeld in Würtemberg. In 1806 he became pastor in Marbach; in 1815 professor of theology and pedagogy in Tübingen. He was a follower of Pestalozzi, and did much for the schools of his native country.

BAHRDT, KARL FRIEDRICH (1714–1792). — A German theologian and educator, prominent in the philanthropinist movement (*q.v.*). Born in Bischofswerda, Saxony, he attended the school of Schulpforta, and then went, rather ill prepared, to the University of Leipzig, where he became professor of biblical theology (1766). Owing partly to his very unorthodox religious views, and partly to his immoral life, he was compelled to give up his university work, and accepted in 1775 a call of Baron de Salis to direct the Philanthropinum of Marschlins in Switzerland. The work there, as well as in a new Philanthropinum, which he opened in Heidesheim in the Palatinate in 1777, was an utter failure. From 1779 until his death, he lived in Halle, where he lectured on moral philosophy, and, at the same time, kept an inn, which was largely patronized by the students.

Bahrdt was a man of brilliant intellect, but totally lacking in character. As a theologian, he was one of the most extreme exponents of rationalism, while his pedagogic ideas are based on those of Basedow. The absurdities of his educational practice, however, as well as his charlatanism and immorality, brought ill repute upon the whole movement of Philanthropinism. F. M.

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BAILEY, EBENEZER (1795–1839). — Schoolman, educated in the schools of Massachusetts and at Yale College; principal of schools in Virginia and Massachusetts and of the Girls' High School in Boston; one of the organizers of the American Institute of Instruction; author of *Young Ladies' Class Book, Philosophical Conversations,* and a textbook in algebra. W. S. M.

BAILEY, WILLIAM RUFUS (1793–1863). — Educator, graduated at Dartmouth College in 1813. For ten years he was a teacher in academies in Maine and New Hampshire, and for twenty years he was principal of secondary schools in Virginia and the Carolinas. He was professor in Austin College, Tex., from 1854 to 1858, and during the next five years he was president of that institution. His textbooks on grammar were widely used in the South. W. S. M.

BAIN, ALEXANDER, LL.D. (1818–1903). — Professor of Logic and English in the University of Aberdeen from 1860 to 1880. He was elected Lord Rector of the University in 1881, and reëlected for another term of office in 1884. He wrote largely on psychological and logical subjects, his chief contributions being: *The Senses and the Intellect* (1855); *The Emotions and the Will* (1859); *The Study of Character* (1861); *Mental and Moral Science* (1868); *Logic, Deductive and Inductive* (1870); *Mind and Body* (1873); *James Mill, a biography,* and *John Stuart Mill, a criticism with some personal recollections* (1882). His chief contributions to educational theory and practice were: *Education as a Science* (1879); *English Grammar* (1863); *A Manual of English Composition and Rhetoric* (1866); *On Teaching English* (1887).

His most important contribution to education is contained in his *Education as a Science.* In this work Bain treats of the scope of education; of the bearings of physiology and psychology on educational practice and methods; of educational values; of the logical and psychological sequence of subjects; and of the methods of teaching the various subjects of school instruction. Chapters are also devoted to moral and to art education. According to Bain, the science of education is confined "to the efforts made of set purpose to train men in a particular way, the efforts of the grown-up part of the community to inform the intellect and mould the character of the young, and more especially to the labours of professional educators or schoolmasters." It is, moreover, the arts and methods employed by the schoolmaster which form the main study of the science of education, for though he is not alone in the work, yet in his efforts he typifies the process in its greatest singleness and purity. If in any way we can improve the art of the teacher, we shall have done nearly all that can be required of a science and art of education. Two important points are to be noted in Bain's conception of education. He excludes physical education from the conception, on the ground that, whilst the "fact of bodily health or vigour is a leading postulate in bodily or mental training," yet the "trainer does not take upon himself to lay down the rules of hygiene." Education again does not embrace the employment of our intellectual functions when directed to productive labor, and as a consequence technical and professional education does not come within the scope of the pure science of education.

The other principle of importance is that Bain considered that the leading inquiry in the art of education is how to strengthen memory, and hence the chief contribution of psychology to education lay in the statement of the conditions of the retentive functions of mind. A. D.

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BAINES, EDWARD (1774–1848). — A leader of opinion against governmental action in English national education; organizer of Mechanics' Institutes; born near Preston (1774); descended from a Yorkshire yeoman family; educated first at Hawkshead Grammar School (where he was a younger schoolfellow of the poet Wordsworth) and afterwards at Preston Grammar School; apprenticed (æt. 16) to a printer in Preston; in 1795 moved to Leeds, Yorkshire, where he entered the office of the *Leeds Mercury;* was ambitious to follow the example of Benjamin Franklin, whose life he made his model; drawn by sympathy with their political principles, he joined the Independents, and was a strenuous advocate of Nonconformist principles during the whole of his political life. In 1801 he became proprietor of the *Leeds Mercury,* which, under his direction, became the chief Liberal organ in the North of England; Liberal Member for Leeds, 1834–1841; vigorous advocate of the abolition of church rates and of the civil disabilities of Nonconformists; a student of county history and author of useful works of topographical research. Leeds was at that time an important center of political and social thought, and out of local discussions on economic and constitutional questions there emerged striking, but somewhat extreme, theories, both in favor of *laissez faire* and of governmental action in social reform. Baines, an honest but self-educated man, strenuous in political agitation, but lacking in philosophic insight into the complexity of English political conditions, became a protagonist of the extreme opponents to the bureaucratic tendency in English administration, which drew its strength from Benthamism on the one hand and socialistic aspirations on the other. In 1846 he addressed a series of letters to Lord John Russell, then Prime Minister, in which he reviewed the extent to which voluntary effort had met educational destitution in England and Wales. He argued that it would be unwise to depart from the principles of voluntary and independent organization in educational work — that any imitation of Continental systems of governmental control of education would impair the habit of English self-reliance, and ultimately undermine political freedom. He maintained that the emulation of the religious bodies, working together with the competition of private schoolmasters, would afford a better guarantee for improvement in national education than any system under the management and support of the State. He violently opposed the new *Minutes of the Committee of Council on Education*, published in August, 1846, with their elaborate scheme of grants to schoolmasters, pupil teachers, and normal schools. With the help of the Rev. Dr. Hamilton of Leeds, he organized a popular agitation against the new scheme of State-aided elementary education. His efforts produced a breach in the Liberal party between those who would apply to national education the principles of *laissez faire* which had been adopted in certain matters of trade, and those who believed that the instruction of the people could not be effectively secured without governmental action and subsidy. In 1848 Baines, with Edward Miall, Henry Richard, and others, delivered, under the auspices of the Congregational Board of Education, a series of lectures upon the relation between education and the State. Baines' lecture *On the Progress in Efficiency of Voluntary Education in England* helped in making the published volume of these lectures (called *The Crosby Hall Lectures on Education*) a *locus classicus* of arguments against government grants for educational purposes. He was also an active friend of mechanics' institutions, and took a chief part in organizing in 1825 the Yorkshire Union of Mechanics' Institutes, by which it was hoped to strengthen the educational work of the institutions by a form of voluntary federation and by coöperation in the employment of traveling teachers of science. In connection with the Yorkshire Union was organized a system of traveling libraries, *i.e.* boxes of books which were sent out in rotation to mechanics' institutions in villages and small towns. The Union, with its traveling libraries, still maintains its work, and the system of traveling libraries subsequently adopted in connection with the university extension system was copied from this precedent.

Baines was typical of the vigor, self-reliance, political zeal, and intellectual limitations of the middle-class Nonconformists in the industrial districts of Yorkshire during the period of individualistic free trade. No one applied in a more thoroughgoing way the doctrines of voluntaryism to the problems of national education. His limited sympathies prevented him from appreciating the possibility of a form of state action in English education which would avoid alike the evils of centralized bureaucracy and of wasteful *laissez faire*. His influence kept many of the industrial leaders in Yorkshire from throwing themselves vigorously into educational reform in conjunction with the State, and by the violence of its prejudices prepared the way for a reaction in popular opinion toward an undue reliance upon governmental effort in elementary education.

M. E. S.

See Adult Schools.

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BAKER, HUMPHREY. — Writer of an arithmetical book called *The Wellspring of Sciences*, 1562. The British Museum has editions 1574, 1580, 1583, 1602, showing the popularity of the work in Queen Elizabeth's reign. Baker's teaching of arithmetic was practical, whilst Recorde's *Ground of Artes* (or arithmetic), enlarged by John Dee, 1561, was strong on the theoretical side. In Baker's book in the 1562 edition is a prospectus of his specialistic school for teaching the subject. This is one of the very early private schools, instituted for business men as well as schoolboys, who ordinarily did not have arithmetic in the grammar school till a much later period. Baker's prospectus states "such as are desirous eyther themselves to learn or to have theyr children or servants instructed . . . it may please them to repayre unto the house of Humphrey Baker . . . wher they shall fynde the Professors of the sai Artes etc. Readie to do their diligent endeavours for a reasonable consideration." For the convenience of those living at a distance, Baker took in boarders. This is a very early instance of a private boarding school. F. W.

BAKER UNIVERSITY, BALDWIN, KAN. — A coeducational institution, the first college of liberal arts in the state, was founded 1858, by the Kansas Educational Association of the Methodist Episcopal Church, an organization chartered by the territorial legislature. The 40 members of the Board of Trustees are elected by the Kansas and South Kansas Conference of the same church. The institution maintains a college of liberal arts, a preparatory academy, a normal school, a conservatory of music, schools of oratory, business, and art, and a summer school. Admission to the college is by examination or certificate from an approved high school; after the freshman year the studies are largely elective. The Normal School requires a common school education; on the completion of a 4-year course, in addition to a satisfactory examination in 5 professional branches, a life certificate is given to teach in any city or district of Kansas. The same certificate may also be given to graduates of the college. The Conservatory of Music confers the degree of Bachelor of Music. The M.A. degree may be gained for 1 year's work in residence or 2 years' *in absentia.* College fraternities have been established as follows: Delta Tau Delta, Kappa Sigma, Delta Delta Delta, Nu Alpha; the last two are women's societies. There are 5 buildings, valued (1906), with grounds and equipment, including libraries, at $307,023. The total annual income is about $42,000. About $9500 a year is appropriated for the support of the college by the Methodist Episcopal Church. There are 724 students (1909), representing 15 states and territories, and divided as follows: College of Liberal Arts, 378; Academy, 152; Normal School, 35; Conservatory of Music, 99; School of Art, 13; School of Oratory, 48; School of Business, 55. Of the 22 members of the instructing staff, 18 are full professors. The average salary of a professor is $1250. Lemuel Hubert Murlin, D.D., is president. C. G.

BALDWIN, JOSEPH (1827–1900). — Educator; educated in the common schools of Pennsylvania, at the New Castle Seminary, and at Bethany (Va.) College. He was instructor in private and state normal schools in Pennsylvania, Indiana, and Missouri; principal of the State Normal School at Kirksville, Mo., for 14 years; principal of the State Normal School at Huntsville, Tex., for 10 years, and from 1891 to 1897 professor of pedagogy in the University of Texas. Author of *Art of School Management, Elementary Psychology and Education, Psychology Applied to Art of Teaching,* and *School Management and Methods.* W. S. M.

BALDWIN, THERON (1801–1870). — Educated in the schools of Connecticut and at Yale College; founded the Illinois College and was its agent (1829–1834); principal of the Female Seminary at Monticello, Ill. (1835–1843); active in the organization of the Western College Society. W. S. M.

BALDWIN UNIVERSITY, BEREA, OHIO. — Founded in 1856 as a coeducational institution for higher education. Preparatory collegiate (classical, philosophical, scientific, legal, and theological), normal, and musical departments are maintained. The requirements for admission to the college are about 15 units. Students may enter the law school and the normal course without fulfilling these requirements. Degrees are conferred in the college department. The institution works in conjunction with the German Wallace College, where commercial courses and other privileges are open to students of Baldwin University. There is a faculty of 9 professors, some of whom are also engaged at the German Wallace College, and 11 instructors and assistants.

BALTIMORE CITY COLLEGE, BALTIMORE, MD. — Founded in 1839 as a high school for boys by the Commissioners of Public Schools on the resolution of the mayor and city council. In 1848 the title of Central High School was adopted; the present title was adopted in 1866. There are 9 members on the Board of Trustees, who are appointed by the mayor. Pupils who have completed the work of the eighth grade in a public grammar school of the city are admitted on the recommendation of their principal and the approval of the superintendent. Others must pass an examination in the subjects of the eighth grade. The usual number of courses of a high school are offered, but 3 years of English, 2 years of a foreign language, 2 years of mathematics, 1 year of science, and 2 years of drawing are constants in all. A complete curriculum consists of 15 units. A department of pedagogy is maintained to afford an opportunity to prepare for the graded list of candidates for positions in the public schools of the city. Students may enter this department in their fourth year. Certificates of graduation are given to those who complete the courses. Francis A. Soper, A.M., is the principal.

BALTIMORE, CITY OF. — The largest city in Maryland, and an important commercial center. Incorporated as a city in 1898, and operating under a special charter granted at the time of incorporation. In 1900 the city had a population of 508,957, and its estimated population in 1909 was 576,023. Of the total population in 1900, 13.5 per cent were negroes, and 15.5 per cent were foreign-born. Of the latter one half were Germans, one seventh Russians, and one eighth Irish. Its school census, 8–16 years of age, was 75,728 in 1908, and its total day school enrollment in 1909 was 80,363 in day schools and 9024 in night schools. It is estimated that 25,000 children were enrolled in private and parochial schools. Of the total enrollment 18.5 per cent was in the schools for the negro race.

History. — The first quasi-public school in

Baltimore was a Lancastrian charity school, opened in 1820. In 1825, the legislature passed an act permitting the establishment of a system of schools in Baltimore, and the levying of a general tax to help maintain them. In 1828, a Board of School Commissioners, numbering 6, was organized, and in 1829, 3 schools were opened. In 1830, the first schoolhouse belonging to the city was erected. By 1839, the school enrollment had increased to 1126, and the mayor and city council requested the school commissioners to establish a high school. This was done, the school opening in 1839, and being one of the earliest high schools established. The next year 9 schools were in operation, with an enrollment of 1834 pupils. In 1849, a Superintendent of City Schools was appointed. In 1898, Baltimore was organized as a city, and adopted a charter in which provision was made for the reorganization of the school system, and for the complete separation of business and educational affairs.

Present School System. — The public school system of the city of Baltimore, at present, is as follows: —

A Board of School Commissioners, consisting of 9 members, appointed by the mayor, for 6-year terms, from the city at large, and from those " most capable of promoting the interests of public education, by means of their intelligence, character, education, and business habits," have control of the schools. The members serve without pay. The board appoints and fixes the salaries of the Superintendent of Public Instruction and his assistants, and all other officers, clerks, and employees, with the right to remove them at pleasure; confirms or rejects all nominations of teachers made by the superintendent, from his graded examination lists; removes teachers on the recommendation of the superintendent after trial; passes on all plans for school buildings and repairs, the work to be done by the Inspector of Buildings; and purchases, through the Board of Awards, textbooks, stationary, furniture, and all supplies. Expenditures for buildings and sites are only indirectly under the control of the Board of School Commissioners.

The Superintendent of Public Instruction is the executive officer of the board. He has general supervision of the schools; examines all teachers, nominates them to the board for appointment and promotion, and assigns and transfers them at will; and advises the board in respect to the course of study, textbooks, and methods of instruction. He is aided by 3 assistant superintendents, and 24 principals, 1 for each of the 24 groups into which the city is divided. A group usually consists of a number of primary schools and a central grammar school. There are 116 elementary schools in the city, besides a number of portable school buildings and rented branch buildings. The superintendent is also assisted by 12 Attendance Officers ; a Supervisor of School Buildings; and special supervisors of drawing, music, physical training, sewing, cooking, and manual training.

The school system includes kindergartens; elementary schools for both races, covering 8 years' work; evening schools; and high schools. In 9 of the elementary schools, German is taught along with English throughout the entire course. Latin may be begun in the seventh year, if desired. Ungraded classes are maintained for irregular pupils. Evening schools are maintained for 6 months each year, on 3 evenings each week. Free textbooks are provided by funds received from the State for that purpose. A Parental School is maintained for the care of habitual truants, committed to it by the Juvenile Court. Instruction in the subjects taught by the special teachers is offered in both the grades and the high schools. Five 4-year high schools are maintained at public expense: the Eastern and Western high schools for girls, and the Baltimore City College, the three of which offer similar secondary work; the Baltimore Polytechnic Institute, a manual training high school; and the colored high school for both sexes, offering general and industrial courses. The city also maintains two training schools for the preparation of teachers for the elementary schools of the city, one for each race. The teachers' training course requires 2 years beyond high school graduation, the first of which is given to study and observation, and the second largely to practice in actual teaching. The enrollment in the training schools in 1909–1910 was 161 in the white school and 82 in the colored school. The passing of the regular competitive examinations for elementary teachers constitutes the graduation. Those passing are placed on a graded eligible list, from which the superintendent recommends for appointment. A teachers' retirement act for Baltimore was passed by the Maryland legislature in 1907.

The city employed 1777 teachers in 1908–1909. Of these 21 were kindergarten teachers, 1514 were in elementary schools, 168 in high schools, and 80 were special teachers. The total expense of maintaining the schools during 1909–1910 was $1,608,776.07, all but $48,768.46 of which was raised by the city by a school tax of 42¼ cents. The average cost for all schools based on average number belonging was $23.61.

E. P. C.

Reference: —

Annual Reports, Board of School Commissioners to the Mayor and City Council of Baltimore, 1829–date. Statistics based on the 1908 Report and 1909 Directory.

BALTIMORE POLYTECHNIC INSTITUTE, BALTIMORE, MD. — The second manual training school in the United States to be established as part of the public school system, organized and opened in 1884 as the Baltimore

Manual Training School, changed to the present title in 1893. The Institute is by charter of 1901 under the control of the Board of School Commissioners appointed by the mayor; these in turn appoint a Board of School Visitors. Students who have completed the elementary school course are admitted to the Institute. The aim of the Institute is to provide a broad education and to lay the foundation for specialization in those professions which are based on mechanical arts and applied sciences. Specialization does not begin until the fourth, the last, year of the course. There were enrolled in 1908–1909 776 students. The faculty includes nearly forty instructors.

BALTIMORE UNIVERSITY SCHOOL OF LAW, BALTIMORE, MD. — Incorporated in 1884 to afford an opportunity to those who wish to enter the legal profession of receiving assistance in their reading. All lectures are held in the evening. The course of instruction is 3 years, and leads to the degree of Bachelor of Laws. No preliminary examination is required for entrance. A moot court is conducted by the members of the law faculty, which numbers 15 lecturers, to afford the students a training in practice, pleading, and forensic debate.

BAMBERG, THE UNIVERSITY OF, BAVARIA. — Established in 1648, the year that marks the close of the Thirty Years' War. It was a Catholic university that owed its origin to the bishop of the territory, the theological faculty being the most important branch of the institution. The university never attained any special prominence, and ceased to exist in 1803.

BANCROFT, CECIL FRANKLIN (1839–1901). — One of the leaders in private secondary education in New England; was educated at Dartmouth College, Andover Theological Seminary, and the universities of Germany. For 12 years (1860–1872) he was principal of secondary schools in New Hampshire and Tennessee, and for 28 years (1873–1901) he was principal of Phillips Academy at Andover. He contributed numerous articles to the literature of secondary education. W. S. M.

BANCROFT, GEORGE (1800–1891). — Historian, educated at Harvard College and the University of Göttingen; tutor at Harvard College; with Dr. Cogswell he founded the famous Round Hill School at Northampton, Mass., in 1823; author of several textbooks and of numerous historical works of great renown. W. S. M.

BANGOR THEOLOGICAL SEMINARY, BANGOR, ME. — Founded in 1814 and opened in 1816 at Hampden, Mass., by the Society for Promoting Theological Education; it was removed to Bangor in 1819. The curriculum covers a period of 3 years. The institution since 1905 is empowered to grant degrees in divinity. The course is open to men and women who have had a college or high school training or its equivalent. There is a faculty of 6 professors and 2 instructors. Rev. David Nelson Beach, D.D., is the president.

BANISTER, ZILPAH GRANT (1794–1874). — One of the pioneers in the higher education of women, was educated by private tutors and at the Rev. Joseph Emerson's Seminary for Young Ladies at Saugus; she taught for several years in the district schools of Connecticut, was principal of the Adams Female Academy at Derry, N.H. (1824–1828), and of the Female Seminary at Ipswich (1828–1839); she contributed numerous articles on female education to the Connecticut *Common School Journal.* W. S. M.

BANKS. — See Savings Banks in Schools.

BAPTIST UNIVERSITY FOR WOMEN. — See Meredith College, Raleigh, N.C.

BARCELONA, UNIVERSITY OF. — See Spain, Education in.

BARET, JOHN. — An English lexicographer of the sixteenth century. The date of his birth is unknown, and it is very probable that he died at some time during 1580. He was a Fellow of Trinity College, Cambridge. He was the author of *An Alvearie or Triple Dictionarie in Englische, Latin and French ; Very profitable for all such as be desirous of any of those three languages. Also by the two Tables in the ende of this booke, they may contrariwise find the most necessary Latin or French wordes, placed after the order of an alphabet, whatsoever are to be found in any other Dictionarie: And so to turn them backwards again into Englische when they read any Latin or French authors, and doubt of any hard worde therein,* 1573. The title *Alvearie* (or beehive) is a reference to the coöperation in the work of his pupils at Cambridge. The work is based on the *Bibliotheca* (*Librarie*) of Sir Thomas Elyot (*q.v.*). The preface contains among others a Latin poem in praise of the author by Richard Mulcaster (*q.v.*). A second edition appeared in 1580, in the preface of which reference is made to the recent death of the author.

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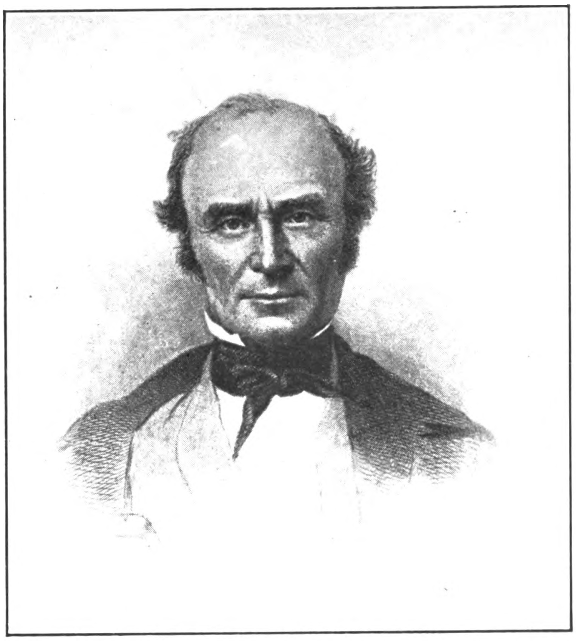
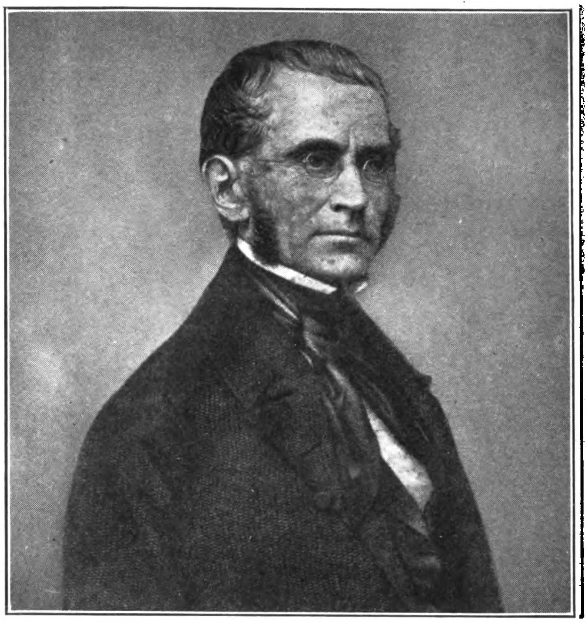
BARNARD'S AMERICAN JOURNAL OF EDUCATION. — See Educational Journalism in America.

BARNARD COLLEGE. — The first result of the movement for the higher education of women in New York City, in which President

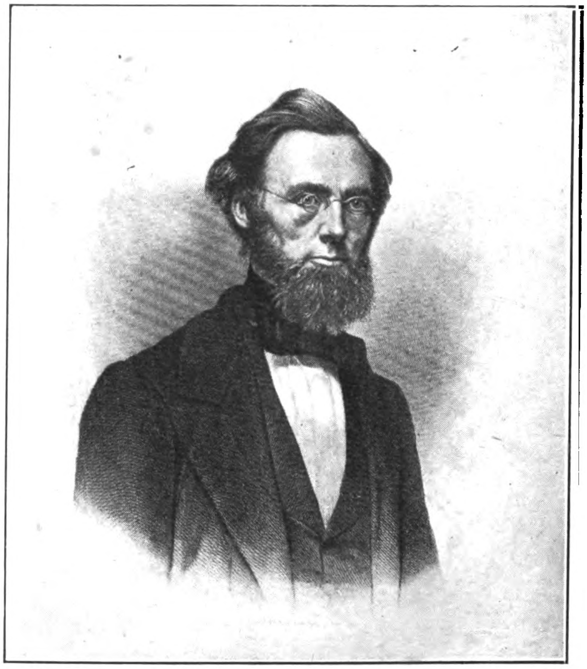


James G. Carter.



Charles Brooks.

Henry Barnard.



Frederick A. P. Barnard.

A GROUP OF AMERICAN EDUCATORS.

Barnard of Columbia College took a leading part, was the adoption of a resolution by the trustees of that college in 1883, offering degrees to women able to pass the appropriate examinations without, however, providing instruction for women leading to these examinations. It was naturally found that this failed to solve the problem, and in 1889 an actual college for women was founded, and began its work in a private house, the instruction being given almost wholly as additional work by members of the Columbia College Staff. The movement had warm supporters, the Barnard Club, for example, having been organized in behalf of the young college by some of the most influential people in New York, and in 1897 sufficient funds had been raised to enable Barnard College to move into three beautiful and well-equipped buildings of its own, on ground adjacent to that of Columbia University. The money had largely been provided by generous members of the Board of Trustees, and in 1903 one of the board presented the three blocks of land lying south of the original property, so that the college has now ample room for growth. A dormitory building has already been erected on this property. The original Chairman of the Trustees' Academic Committee, Miss Ella Weed, was practically head of the college until her death in 1894. She was followed by Miss Emily James Smith (Mrs. George Haven Putnam) as Dean, and she in 1900 by Miss Laura Drake Gill. Since Miss Gill's resignation in 1907, the college has been under the direction of Professor William T. Brewster, elected Provost in 1910.

The faculty now numbers 33, and there are in addition 38 officers of instruction and administration. Through the exchange of courses by officers of the Barnard Foundation for those by other university officers, it is possible to extend a wide tender to the students of the college. Three programs of study are offered, one leading to A.B.; another, which makes particular provision for intensive work in the natural sciences, leading to B.S.; and a 2-year course not leading to a degree, but designed to afford preliminary training for professional study in Teachers College and elsewhere. The graduate work formerly undertaken by Barnard College was turned over to the university in 1900.

The college owns and occupies for educational purposes buildings and grounds of an assessed valuation of more than $2,000,000, and has in addition more than $1,000,000 held for investment. The annual budget is something over $157,000, of which two thirds comes from students' fees, and practically all of the remainder from investments. The buildings provide more than 1200 sittings, the total floor area, including the dormitory, being about 150,000 square feet. The present student registration is 513; the total undergraduate registration since the founding of the college, 3882; and the total number of degrees granted, over 800.

In 1900 the relations of Barnard College to Columbia University were defined in a formal agreement, which makes provision that in every way Barnard College, while retaining its independent corporate existence, bears, as an undergraduate institution for women, the same relation to the university as a whole as does Columbia College for men. In other words, its position is unique among women's colleges in that, while independent and interested in its own welfare, it shares the resources and ideals of a great university. F. P. K.

BARNARD, FREDERICK AUGUSTUS PORTER (1809–1889). — The tenth president of Columbia University, and the author of numerous textbooks and works on education; was born at Sheffield, Mass., May 5, 1809, and was graduated from Yale College in 1828. He was 2 years a tutor at Yale, and 6 years instructor in the school for the deaf at Hartford and master of the grammar school in that city. In 1837 he became professor of mathematics in the University of Alabama, and 11 years later was appointed to a similar post in the University of Mississippi. From 1856 to 1861 he was president of the University of Mississippi, and in 1860 he accompanied a scientific expedition to Labrador to study the total eclipse of the sun. He became president of Columbia in 1864, and was at the head of that institution until his death. He was one of the incorporators of the American Association for the Advancement of Science (*q.v.*) (its president in 1860), and of the National Academy of Science (*q.v.*) (its foreign secretary from 1874 to 1880). He was also active in the American Association for the Advancement of Education (*q.v.*) (its president in 1855), and made notable contributions to the educational journals of his day. He represented the United States at international expositions at Paris in 1867, and again in 1878. His reports to the trustees of the University of Mississippi and Columbia University have been characterized as "of the highest practical importance in the history of American education." Besides numerous contributions on education and science to the *North American Review* and the *American Journal of Science and Arts*, and Johnson's *Encyclopedia* (of which he was editor-in-chief), his published works include *Treatise on Arithmetic* (1830), *Analytic Grammar with Symbolic Illustrations* (1836), *Letters on College Government* (1854), *Collegiate Education* (1854), *Art Culture* (1854), *History of the United States Coast Survey* (1857), *University Education* (1858), *Academic Degrees*, and scientific works on the undulatory theory of light, machinery, and processes of the industrial arts, and the metric system of weights and measures. He died at New York City, April 27, 1889. W. S. M.

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BARNARD, HENRY (1811–1900). — Educator and author, activity in so many fields of education place him easily with Horace Mann among the foremost American educators. He was born at Hartford, Conn., Jan. 24, 1811. He received his elementary and secondary education in the Hopkins Grammar School at Hartford and the Monson Academy, and his collegiate education at Yale, graduating in the class of 1830, and began the study of law in the office of Willis Hall, afterwards attorney-general of the state of New York. Upon the request of President Day of Yale he took charge of an academy at Wellsboro, Pa., for a year. He went to Europe in 1835 to study the social and educational institutions, and his work on *Reformatory Education*, which was the result of this tour, was not only one of the earliest, but one of the most important American contributions to the literature of the care and treatment of juvenile delinquents. He visited Hofwyl, and, while keenly impressed with the work of Fellenberg (*q.v.*), was much more influenced by the labors of some of Pestalozzi's other disciples, whom he visited in Switzerland and Germany. Upon his return to America in 1837, he was elected a member of the legislature of Connecticut, and formulated the measure which created the State Board of Education and is the basis of the present Connecticut school system. A board of education for the supervision of the schools of the state having been created, Mr. Barnard was induced to accept the post of secretary for one year, as it was his intention to take up the profession of law. The reforms in Connecticut during the four years that he was at the head of the system (1838–1842) were not less significant than the better known reforms which Horace Mann at the same time was carrying out in Massachusetts. One of the most notable measures of his administration was the organization in 1839 of the first teachers' institute. Extensive use was made of the institutes in the training of teachers. Besides the instruction which he himself gave, Barnard secured the services of professors in Yale College and other institutions for series of lessons and lectures on methods of teaching the common school branches. He also established the *Connecticut Common School Journal* for the dissemination of knowledge among teachers, boards of education, and friends of the common schools. Salutary laws were enacted, and, to quote from Horace Mann, "the cold torpidity of the state soon felt the sensations of returning vitality." The next six years (1843–1849) he was engaged in a similar mission in Rhode Island. He organized in 1845 the Rhode Island Institute of Instruction, the oldest state teachers' association in the United States. He was active in the organization of town libraries for the use of the schools, and at the termination of his labors 29 out of the 32 towns of the state had libraries of 500 or more volumes. He was also active in the organization of popular lecture courses in the towns for the teachers and the general public. For his teachers' institutes he devised a traveling model school, which he placed in charge of William S. Baker. Teacher and children were taken from town to town in a wagon fitted out for the purpose of giving practical lessons in pedagogy. In 1851 he was again elected secretary of the State Board of Education of Connecticut and principal of the newly organized State Normal School at New Britain, in which capacity he served the State for four years. It was during this period that he published his book on *Normal Schools* (Hartford, 1851) and his work on *School Architecture*, the first American book of its kind. He was active in the organization of the American Association for the Advancement of Education (*q.v.*), and was its president in 1855. He represented the United States at the educational congress held at London in 1854, and saw exhibited for the first time the workings of Froebel's system of Kindergarten, of which he published the first American account. In 1855 he began the publication of his monumental *American Journal of Education*, which is unquestionably his greatest contribution to educational literature. He continued to edit this journal for 26 years in the face of heavy financial difficulties, publishing in all 32 volumes of more than 800 pages each. It was not an educational journal in the accepted use of that term, but, as Robert Herbert Quick (*q.v.*) once remarked, "a vast encyclopedia of educational literature." (See article on Educational Journalism.) In 1858 Mr. Barnard was chosen chancellor of the University of Wisconsin, and added to this labor the organization of the State Normal School and the conduct of the teachers' institutes. Overwork and failing health compelled him to resign at the end of two years. During this period he published 7 volumes of *Papers for Teachers*, which included accounts of and translations from Comenius, Rousseau, Pestalozzi, and other great educational reformers, together with papers by William Russell, James G. Carter, William C. Woodbridge, and other contemporary educators (see articles on these). At the close of the Civil War he accepted the presidency of St. John's College at Annapolis, Md., but resigned a year later to accept the post of United States Commissioner of Education, which Congress had created. A dozen years before he had advocated before the American Association for the Advancement of Education (*q.v.*) a national department of education; and James A. Garfield, who had introduced the measure in Congress, joined with the educators of America in recommending to President Johnson the appointment of Mr. Barnard. He organized the U. S. Bureau of Education (*q.v.*), and outlined the policy which it has since followed in the collection of educational statistics and in attempts at the unification of the educational forces of the country. Besides the reports of the Bureau, he made an exhaustive study of the conditions of schools in the District of Columbia, and made it the subject of a special report. While not a partisan in politics, Mr. Barnard had always clung to the political doctrines of Thomas Jefferson, and with the election of President Grant he was superseded by General John Eaton. This practically closed his active educational career, although he did editorial work on his journal, and gave many educational addresses during the 30 years that followed. Besides his reports as superintendent of schools in Connecticut and Rhode Island, and as United States Commissioner of Education, and the 4 volumes of the *Connecticut Common School Journal*, the 3 volumes of the *Rhode Island Institute of Instruction*, and the 32 volumes of the *American Journal of Education* he published 52 works on the history and theory of education and accounts of European and American school systems. Among such works are his *Pestalozzi and Pestalozzianism*, *Kindergarten and Child Culture*, *German Schools and Teachers*, *American Pedagogy*, *English Pedagogy*, *National Education in Europe*, *School Architecture*, and *Normal Schools*. He gave America her earliest literature of education. He touches at many points most of the progressive educational movements of the nineteenth century. He died at Hartford (in the house in which he was born) on July 6, 1900.

W. S. M.

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Philbrick. Labors of Henry Barnard in Connecticut and Rhode Island. Barnard's *American Journal of Education*, 1856, Vol. I, pp. 659–738.

BARNES, MARY SHELDON. — Daughter of Edward Austin Sheldon, who originated the Oswego movement, was born at Oswego, N.Y., Sept. 15, 1850. She received her elementary and secondary training in the schools of Oswego and the Oswego Normal School, and her collegiate education at the University of Michigan, graduating in the first class that admitted women to that institution. She subsequently studied at Newnham College, Cambridge, England, and at the University of Zürich. She was professor of history at Wellesley College from 1876 to 1880, at the Oswego normal school from 1882 to 1884, and at Stanford University from 1891 to 1896. She married Professor Earl Barnes in 1884, and devoted the next 7 years to study and travel. Mrs. Barnes had been trained in the Pestalozzian method at Oswego, and she was the first in America to apply the Pestalozzian method to the teaching of history. She applied the inductive method to the development of local historic concepts and the gradual upbuilding of the historic sense by means of objective materials. Her *Studies in General History* and *American History*, with the teachers' manuals accompanying the same, together with her *Studies in the Historical Method*, give the pedagogic basis of her method. As the first American teacher to develop the source method of historic instruction, and thus bring her students into thoughtful relation with historical realities, she was a pioneer. In addition to the works already referred to, she was the author of numerous papers on the study of local history and the development of the historic sense in primitive man and the child. She died at London, England, Aug. 27, 1898.

W. S. M.

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BARNES' TEACHERS' MONTHLY. — See Educational Journalism in America.

BARRING OUT THE TEACHER. — A custom common in earlier times in Great Britain and America, and not unknown in other countries. The barricading of the schoolroom against the teacher seems originally to have been connected with the observance of some holiday, as Shrove Tuesday, and was usually employed by the pupils to enforce customary rights as to holidays. Frequently it came to be used to enforce any demands which the pupils might have to make, or even as a form of disapproval in general. This type of disturbance frequently occurred in Scotch schools from about the end of the sixteenth century, and often assumed a very serious character, as, for example, in 1587, when after a barring-out at the Edinburgh High School it was found that the scholars had provided themselves with all kinds of firearms. At the same school occurred a barring-out in 1595 which resulted in the fatal shooting by a boy of one of the city officials whose assistance had been summoned.

Charles Hoole (*q.v.*) in his work on *Scholastic Discipline*, published in 1659, discusses the custom at length. "I should here add something touching these usual customs which are yet on foot in most places, of scholars excluding or shutting out the master once a year, and capitulating with him about orders to be observed, or the like; but forasmuch as I see they differ very much, and are of late discontinued in many schools, I will only mention how they may be carried on, where they yet remain, without any contest or disturbance, till at last they die of themselves."

Hoole then states six rules to be followed by the students, stipulating (1) that there should be no barring-out until after St. Andrew's Day (*q.v.*); (2) that the scholars behave civilly though merrily and use no weapons nor injure one another; (3) that the demands be formulated by the heads of each class and preserved in writing through the highest scholar; (4) that the master keep aloof during the conference of the pupils; (5) that exercises or examples of work be exposed by each scholar for the teacher; (6) that the teacher should be notified and be accompanied by parents or friends. Hoole adds: "In London and most other places, the usual manner remaineth of breaking up schools (for a time of intermission of studies and visiting of friends) about a week before Christmas, Easter, and Whitsuntide, till the week following those holy days begin, at which time every scholar bringeth something to the master as a token of his own and his parents' gratitude for his care and love towards him."

Thus our school holidays seem to have been established. But Hoole also provides rules for the teacher, requiring him among other things to make small gifts to each pupil or a modest collation as an acknowledgment of the "courtesies" of the pupils.

In America the "barring-out" came to be definitely connected with the latter custom as well as with the holidays, and was adopted by the pupils to enforce both privileges. A Virginia schoolmaster (see Fithians' *Journal and Letters*, p. 64) writes in 1774, "Mr. Goodlet was barred out of his school last Monday by his scholars, for Christmas Holidays, which are to continue till twelfth day: but my scholars are of a more quiet nature, and have consented to have four or five days now and to have their full holiday in May next, when I propose by permission of Providence to go home." During the early nineteenth century barring-out became a recognized test of authority or power between pupils and master, and was frequently resorted to early in the term. In the frontier states it was a test to which every schoolmaster must submit, as in a way he was on examination for fitness. With the introduction of the woman teacher and a modern conception of education, the practice disappeared. Recent instances of "strikes" among college and high school pupils are no doubt but a survival.

See Boy Bishop.

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Eggleston, Edward. *The Hoosier Schoolmaster.*

BARTLETT, SAMUEL COLCORD (1817–1898). — Educator, graduated at Dartmouth College in 1836, and Andover Theological Seminary in 1842; principal of secondary school in Vermont (1836–1838); professor in Western Reserve College (1846–1852) and in the Chicago Theological Seminary (1858–1877); president of Dartmouth College (1877–1892); author of several theological works. W. S. M.

BARTLETT, WILLIAM HOLMES CHAMBERS (1804–1893). — Educated in the public schools of Pennsylvania and at the West Point Military Academy; instructor in the latter institution (1834–1871); author of *Elements of Natural Philosophy*, *Treatise on Astronomy*, *Analytical Mechanics*, and of numerous works on acoustics and optics. W. S. M.

BARZIZZA, GASPARINO DA (GASPARINUS BARZIZIUS).—Born at Barzizza near Bergamo about 1370, died 1431. He is celebrated as a collaborator with Petrarch, a commentator upon the *De Oratore*, *De Officiis*, *De Senectute*, *Letters* and *Philippics* of Cicero, a collector of manuscripts, a teacher successively at Pavia, Venice, Padua, Ferrara, and Milan. His style of Latin was elegant, correct, and graceful, not a slavish imitation of the Ciceronian mode. His *Book of Letters* had the distinction of being printed in 1470 in Paris, being thus the first book turned out by the French printing press. The main interest of Barzizza was in scholarship, but his teaching, which was essentially an endeavor to naturalize the content of the classical civilization in the Italy of his day, appears to have been as influential as his learning.
P. R. C.

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BASAL READERS. — Reading books designed for teaching beginners to read during the first school year. Basal readers are sometimes spoken of as "foundation readers," or as "beginning readers." These usually include the "primer" and the "first reader." They may be of two types: (1) "Method readers," where the material is primarily selected with reference to phonetic difficulties, so that the child will more readily acquire the independent power to pronounce words from the printed page, and (2) "Non-method readers," where phonetic and diacritical factors are quite subordinated to the thought of the material presented. H. S.

See Reading, Teaching of.

BASAL READING. — The preliminary drill in the mechanics of reading, designed to be a foundation for later reading in which thought and feeling rather than pronunciation are the conscious factors. Basal reading covers the first and second school years, more particularly the first.

BASEBALL. — There is no definite evidence concerning the origin of baseball. The English game of "rounders" and the New England game of "one old cat" or "two old cat" both contributed something to the earliest form of baseball.

Rounders was played on a ground shaped like a regular pentagon with the home base at one angle and four others at the other angles, perhaps 45 or 60 feet apart as compared to the 90 feet in baseball. The server or pitcher stood in the center and tossed the ball to the batter, who stood at home plate. There used to be, as at baseball, one side out in the field and the other in at the bat, not less than 10 players nor more than 30 in all. The ball was tossed by the pitcher to the catcher; the batsman had a limited number of chances to hit the ball out of reach of the players and thus secure his base; the batsman was put out by failing to hit the ball or by getting caught between bases. In all these points rounders was much like modern baseball.

Rounders was played by schoolboys in the United States until it was gradually displaced by the new game of baseball. The first crude games of baseball were played in Philadelphia and New York about 1840. A national association of players was organized in 1858, but the Civil War checked further progress. In 1865 the game began to be played again, and developed rapidly.

The first college game of baseball was played on July 1, 1859, at Pittsfield, Massachusetts, between Amherst and Williams, and was won by Amherst, 73–32. Other colleges soon had baseball teams, and in 1879 the Intercollegiate Baseball Association was organized, including Harvard, Princeton, Brown, Amherst, and Dartmouth. Since that time the game has developed to such proportions that nearly every college and secondary school in the country has one or more teams, and a majority of the boys in the elementary schools play the game. In New York City, Springfield, Massachusetts, and a number of other cities, there are regularly organized leagues of grammar school baseball teams.

Baseball is recognized as the national game of the United States; it is played by more individuals and for a longer time each year than any other game. Considered from the standpoint of its educational value, baseball is the best game in general use in our educational institutions. It can be played by students of all ages, from the elementary school to the university; it affords general, varied, and wholesome exercise; it is intensely interesting; it serves to develop agility, quick perception, judgment, and accuracy ; it inculcates valuable moral habits, such as coöperation, obedience to the captain and umpire, and loyalty to the team and school. Of course, the educational value of baseball is dependent upon proper instruction and regulation to insure that the game be played according to the rules and with due regard to the ethics of sport. Without proper supervision, baseball often degenerates into a rough game, physically dangerous and morally injurious to the players.

The regulation ground requires a smooth field, at least 350 feet square exclusive of the space for grand stands. The home base is located 90 feet from the back stop at the end of the field, and constitutes one corner of the "diamond"; the sides of the "diamond" are 90 feet long and serve as base lines. The distance from home base along the base lines and through the center of the diamond to the nearest fence should be at least 235 feet.

When a baseball field is to be used by boys under 16 years, the length of the base lines should be reduced from the regulation 90 feet to about 75 feet.

The difficulty of finding vacant land large enough for baseball grounds in cities has led to modification of the game on city playgrounds. The modified game is called playground ball, and is played successfully on small areas, so that three or four games may be carried on simultaneously on a ground barely large enough for one game of regular baseball. The essential modification is in the ball, which is made larger and softer than the regular baseball, thus greatly lessening the distance that it can be batted and thrown. The base lines are decreased in proportion.

A similar modification of baseball has been made to adapt the game to gymnasium floors indoors. The use of a large soft ball and a small bat, and a rule requiring that the ball be tossed instead of thrown, alter the game sufficiently to make it perfectly safe in the gymnasium, while retaining the essential features of baseball. This modification of baseball has made it a most valuable and fascinating game for girls. It is played by girls in the gymnasium and out of doors in many schools and colleges, and is growing in popularity every year. G. L. M.

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BASEDOW, JOHANN HEINRICH (1724–1790). — Prominent, educational reformer. He was born in Hamburg, the son of a wigmaker. Both parents were of a gloomy temperament; the mother died in a fit of insanity. At the age of 18 he ran away from home and found refuge in the house of a physician. After about a year he returned to Hamburg and continued his education at the gymnasium (1743–1746). He then spent two years at the University of Leipzig, after which he accepted a position as tutor. He entered upon this work with great enthusiasm, and his methods, which were based on the principles of Locke and Comenius, were very successful. He discarded memorizing, made much use of common objects, and taught Latin in an easy conversational way. In 1753 he was appointed professor of ethics and literature at the Danish Academy in Soroe. His unorthodox religious opinions caused his transfer to the gymnasium in Altona (1761). There he issued a number of theological pamphlets, which still further drew upon him the persecution of the orthodox party.

Stimulated by the interest in education which had been excited by the appearance of Rousseau's *Émile*, he resolved to become an educational reformer, and, in 1768, issued his *Vorstellung an Menschenfreunde und vermögende Männer über Schulen, Studien und ihren Einfluss in die öffentliche Wohlfahrt* (*Appeal to the Friends of Humanity and Men of Means, on Schools, on Studies, and their Influence on Public Welfare*). In this he developed the plan of a national school system with reformed methods of instruction. As he considered the preparation of appropriate textbooks, which did not yet exist, to be the first step toward a really efficient reform of education, he proposed the publication of an Elementary Book, which should contain the whole subject matter to be used in the instruction of children. The cost of publication of this work was to be defrayed by popular subscription. The success of this appeal was phenomenal; nothing since the time of Luther's address to the German cities had stirred up the nation to such an active interest in education. Money poured in from all sides, and the work appeared in 1770, preceded by a *Methodenbuch für Väter und Mütter der Familien und Völker* (*Book of Methods for Fathers and Mothers of Families and Nations*). The *Elementarwerk* was afterwards (1774) revised and enlarged to 4 volumes, illustrated by 100 plates, thus forming a work analogous to the *Orbis Pictus* of Comenius. At the same time Basedow was given the opportunity to put his reform ideas into operation. At Dessau, where he had been called by Prince Leopold of Anhalt-Dessau, he established an institution for the education of boys of wealthy families and for the training of teachers. The institution, which he called the Philanthropinum, was opened in 1774. It was not successful. Basedow, although splendid as a pedagogic writer and agitator, not only lacked teaching experience and organizing ability, but his irascible temper made it impossible for him to work with others. In 1778 he withdrew from the management, and, for a time, turned again to theological writing. The last five years of his life he spent partly in Dessau and partly in Magdeburg, where he taught in a small school in order to test a new method of teaching reading which he had invented.

Basedow's character has often been harshly judged, especially by the opponents of his religious and educational views. Suffering from a hereditary taint and from the vulgar associations of his youth, he totally lacked tact and social grace. At times, especially when under nervous strain caused by his erratic methods of work, he was intemperate. It is also true that much of his writing reads like that of a charlatan. Nevertheless it cannot be doubted that his zeal for the cause of education was sincere, although he was often carried away by his own enthusiasm. Had he been an imposter, he could never have earned the approbation of such men as Kant, Mendelssohn, and even Goethe. Among the reforms of education which are more or less directly due to Philanthropinism, the movement headed by Basedow, the following may be mentioned: the emphasis on pleasurable interest in teaching; on realistic instruction; on object teaching, and nature study; on physical education; the improvenent of textbooks; the creation of a new literature designed for children; and the conversational method in the teaching of foreign languages. F. M.

See PHILANTHROPINISM.

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BASEL, SWITZERLAND, THE UNIVERSITY OF. — Established in 1460, having been authorized by a papal bull in the previous year. The original suggestion for its foundation came from the citizens themselves, whose wishes were fulfilled by Pope Pius II. Among its early teachers were the celebrated preacher Johann Geiler von Kaisersberg and Sebastian Brant, author of the famous *Ship of Fools.* The university played a prominent rôle during and immediately after the Protestant reformation, Erasmus (*q.v.*) having joined the theological faculty in 1520 and Œcolampadius three years later, the second half of the sixteenth century being the period of its greatest renown. During the second half of the following century the institution entered upon a period of stagnation, but in the eighteenth century it received a new lease of life, largely through the work of the mathematicians Bernoulli and

Euler (*q.v.*). Basel is still regarded as one of the main bulwarks of Protestant theology in Switzerland. The university comprises the four traditional faculties of theology, law, medicine, and philosophy, the last-mentioned containing the customary philological-historical and mathematical-scientific groups. The German language serves as the medium of instruction. The library contains over 250,000 volumes, as well as 1500 manuscripts. The canton appropriates about $85,000 to the university annually, the income-bearing funds of the institution being valued at approximately $300,000. Basel attracted 782 students in the winter semester of 1909–1910, of whom more than half were enrolled in the faculty of philosophy. R. T.

BASEMENT IN SCHOOLHOUSE. — See Architecture, School.

BASHFULNESS. — Sometimes described as an instinct, closely related in character to fear. It appears especially in children, sometimes passing through several periods of varying intensity. It consists in an inhibition of voluntary activity, a heightening of the general muscular tension, and a disposition to retreat from social notice. It is opposed in character to what is sometimes called the social instinct. See Instinct and Emotional Expression.

BASÍL, THE GREAT, BISHOP OF CÆSAREA. — The founder of monasticism, who, with Gregory of Nyssa (*q.v.*), his brother, and Gregory of Nazianzus (*q.v.*), his intimate friend and schoolfellow, make up the group of theologians known among the Fathers as the "three great Cappadocians." Basil was probably born in the year 329 at Cæsarea in Cappadocia, where his father, Basil the elder, was a successful teacher of rhetoric. The early education of Basil was intrusted to his grandmother, the saintly Macrina, one of the women of the Church to be grouped with Monica, and in this Macrina followed the educational precepts of Gregory Thaumaturgus (*q.v.*). As a young man Basil studied first with his father and afterwards at Athens, where his companions were Gregory of Nazianzus, and for a time the future emperor Julian, with whom he was for some years on terms of friendship. After spending several years at Athens, Basil returned to Cæsarea, where he practiced the profession of an instructor in rhetoric with success, and also undertook the education of boys. In all this his experience was strikingly unlike that of St. Augustine. Throughout this trying period in his life he remained a pure and upright man. When, therefore, he underwent his "conversion," whereby, encouraged by his mother and sister, he gave up the life of a rhetorician, with its temptations of pride and vanity, to embrace the monastic life, he never adopted the pessimistic position of Augustine. As yet, however, the monastic life was hardly organized in the Church, though ascetism was in high esteem as a means of attaining Christian perfection. The solitary monks of Egypt had, indeed, gradually gathered in communities, but the hermit life was the only form of asceticism then known in Asia Minor. Basil saw the defect of a system which aimed at Christian perfection and yet by isolation rendered impossible the highest virtues, which were social in their nature. The community life was therefore his ideal. In the developed form of his rule, which remains as the general rule throughout the East, the monasteries were organized as self-supporting societies, in many respects similar to the Benedictine monasteries of a later period in the West. Basil did not remain a monk many years, for he was ordained presbyter in 364, and served as the coadjutor to Eusebius, Bishop of Cæsarea. He succeeded to that see in 370, and remained there for the rest of his life, and in this position became the leading champion of the Nicene party. He died in 379 at the early age of 50, worn out by his labors and his austerities, which had early undermined his health.

Basil's place in the history of pedagogy is assured not only by his very extensive institutional work, but still more by two works, his rules for monks and his homily on the use of pagan literature (*Oratio ad Adolescentes*, Hom. XXII). The first were notable not merely for wise insight into the conditions of moral training, for the monastic system in the Church has always been a system of higher moral training to which those who aimed at Christian perfection submitted themselves, but also the place in that system of the education of the young children given by parents to the monasteries or received as orphans. The monastery school arose as a provision for these children in the East, and became, as in the West, a part of the monastic establishment. The point of most interest in these rules concerning education of children in the monasteries is the conception of the method and purpose of punishment. There should be some rational connection between an offense and its punishment, which should be more than suffering inflicted for wrong-doing. It should be an exercise in the opposite virtue. The child that injured another should seek the forgiveness of the child wronged and seek to perform acts of kindness for him; the greedy child should be punished by being deprived of a portion of his food; the evil speaker should be sentenced to a period of silence. In his attitude toward heathen literature Basil took the position that there was benefit to be gained from the study of all kinds of writings. There was much in the heathen writers offensive to believers in Christianity, and much that was bad morally. But we must not take things indiscriminately, but rather only what is profitable. It would be shameful for us who in the case of food reject the injurious, to take, in the case of studies, no account of what keeps the soul alive, but like mountain streams to sweep in everything that happens to be in our way. With this spirit Basil could find much moral instruction even in myths, which to a mind less liberally trained or of a more literal turn of thought were offensive. This position, which is to-day self-evident, was by no means so at a time when Christianity was still standing opposed to a heathenism which, in spite of the existence of many heathen of high character and noble lives, was not unjustly associated with what was most corrupt in the life of the times.

J. C. A. Jr.

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BASKERVILLE, WILLIAM MALONE (1850–1899). — Educator and author; educated at Randolph-Macon College and the University of Leipzig; professor in Wofford College and Vanderbilt University; author of *Higher Education of Women* and of numerous English texts.

W. S. M.

BASKETBALL. — The history of the origin and development of basketball is radically different from that of other games. Most of our popular games, like basketball, football, and cricket, were developed gradually over periods of scores or hundreds of years. Not so with basketball, which was invented in 1891 and in less than three years had become the national indoor game of America. The circumstances attending the invention of this game explain to some extent its remarkable success. Dr. Luther Halsey Gulick told his class in philosophy of physical training at the Springfield Y.M.C.A. Training School that a real need existed for an indoor game having the following characteristics: (1) Vigorous enough to develop general organic vigor. (2) Suitable for gymnasiums of different size and proportions. (3) One that should not necessitate elaborate and expensive equipment for the game or players. (4) Simple enough to be played by individuals not endowed with unusual size, strength, and skill. (5) It should be interesting. Dr. Gulick requested his students to submit games embodying these characteristics. Mr. (now Dr.) James Naismith submitted the game of basketball. The game was tried by the students in the Training School with very satisfactory results.

The main features of basketball as first worked out by Mr. Naismith have been retained, although many changes and additions in minor details have been introduced from time to time. In the beginning the game was played with 9 on a side; a little later the number was reduced to 7, and later to 5. The growth of interest in basketball has been phenomenal. For two or three years, the game was played almost exclusively in the gymnasiums of the Young Men's Christian Association; it was then taken up by the colleges, schools, and athletic clubs, and before 1900 was played in nearly every gymnasium in the country.

There are many good indoor games in use in connection with the physical activities of our schools and colleges, but basketball is played more than all other indoor games together, and is by far the most popular. This great popularity is justified because basketball combines many important educational advantages. As an exercise it is one of the most valuable for developing organic vigor of heart and lungs, agility, bodily control, and endurance; as a game it affords admirable training in self-control, judgment, coöperation, obedience, and loyalty; as a means of recreation it is fascinating. Besides all these positive advantages of the game itself, basketball is a most valuable game because it is adapted to boys and girls of all ages; it is so simple that players enjoy it from the beginning; it may be played in a gymnasium of any size or shape, and is also a good outdoor game; and it requires less paraphernalia for the game and the players than any other game.

There are dangers in basketball when the game is not properly regulated. The game is so fascinating that players are tempted to play until overfatigued; students whose hearts are weak or who are untrained should be cautioned and supervised most carefully if allowed to play at all. Many cases of heart strain and impaired health have resulted from unregulated basketball. The game is so exciting that it easily degenerates into a rough and tumble fight for the ball, if not carefully regulated. Students should never be permitted to play basketball without an umpire to direct the game and enforce the rules.

College men play basketball with 5 players on a side, and the players are allowed to run all over the court. Many of the leading directors of physical education consider this game too violent for girls and women. In order to meet this objection, Dr. Dudley Allen Sargent modified the game by dividing the court into three equal parts and limiting the activity of each player to one third of the court. The modified game is usually played with 9 on a side though it may be played with 7 or even 5 on a side. The rules are the same as in the men's game, except that the players are required to remain in one section of the court, and the rules governing rough playing are more severe. The result of these modifications is a less strenuous game, much better adapted to girls and women than the regular game as played by men. G. L. M.

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BASKETRY. — See Textiles, in the Schools.

BATAVIA SYSTEM. — A name for an idea worked out, within recent years, by Superintendent John Kennedy, of Batavia, N.Y., and having for its purpose the improvement of instruction in the public schools. In Batavia it has been put into practice in both the elementary schools and the high school. The idea has awakened much interest; hundreds of superintendents, principals, and teachers have visited Batavia to inspect the schools and to examine into the workings of the system; and the idea or plan has been adopted by a number of cities in other parts of the United States, from Maine to California. The essential features of the plan are based on the belief that too much time has heretofore been given to wholesale recitation work; that both the brighter and the poorer children in the class have been unnecessarily sacrificed to the class system; and that the strain on teachers has been too great. In the working out of this idea the remedy adopted has been to have but one class to the room, unless there are more than 50 children, in which case there are two classes and two teachers; to give each teacher half of her time each day free from recitation work, to use in watching the pupils in their studies, and helping where help is needed; and in case a second teacher is added to a room, such teacher is not an inexperienced beginner, but an old and a successful teacher. A decrease in the amount of class recitation work and an increase in the amount of individual study and individual assistance are the central features of the plan. It is claimed for the plan that pupils working under it become more independent workers and make better individual progress. The idea is much like the "Pueblo Plan," inaugurated some fifteen years ago at Pueblo, Col. On the other hand, certain objections to the plan are found by some teachers, on the ground that the pupils miss the helpful stimulus that comes from group work under a strong, sympathetic teacher; that bright pupils are neglected under this system for dull pupils; and that the plan tends toward average results even more than the grade system. Advocates of the Batavia plan contend that, on the contrary, the exact opposite of these contentions is a marked feature of the plan. The success of the Batavia idea, where tried, would indicate a wide field of usefulness for it, despite certain obvious limitations.

Batavia is a city of 9180 inhabitants, according to the census of 1900, and an estimated population in 1908 of 10,774. The city employed 52 regular teachers and 3 supervisors in 1907–1908, maintained 187 days of school, and had a total enrollment of 1624 pupils in all of its schools. E. P. C.

BATEMAN, NEWTON. — Educator, born at Fairton, N.J., July 27, 1822; educated in the public schools of New Jersey and at Illinois College and Lane Theological Seminary; principal of school at St. Louis (1845–1846); professor in St. Charles College, Missouri, from 1847 to 1851; principal of Female College at Jacksonville, Ill. (1851–1857); state superintendent of public instruction in Illinois from 1858 to 1870; president of Knox College (1875–1893); active in the educational organizations of Illinois; died at Galesburg, Ill., Oct. 21, 1897. W. S. M.

BATES COLLEGE, LEWISTON, MAINE. — A nonsectarian, coeducational institution, chartered in 1864, as the result of a petition in 1862 of 16 students in the Maine State Seminary, who wished collegiate instruction from that institution. The Maine State Seminary was established in 1855 to replace the Parsonsfield Seminary, destroyed by fire. Through the efforts of Oren B. Cheney and Ebenezer Knoulton, Baptist clergymen, it was granted aid by the state legislature. At its beginning, the seminary was independent of church control and without denominational restrictions. In 1862, Benjamin E. Bates, one of the founders of the city of Lewiston, gave $25,000 to establish the college petitioned for, with a further gift of $75,000 in 1863. The charter organized a governing board consisting of a Board of Fellows and a Board of Overseers, with several seats in the latter board to be filled upon nomination of the alumni; this bicameral arrangement closely follows that of Bowdoin College, which, in turn, was modeled upon Harvard University. In 1891, at the request of President Cheney, the legislature amended the charter by prescribing that the president and a majority of both boards should be members of the Free Baptist denomination; in 1907, again at the request of the college, this amendment was repealed and Bates College was accepted by the Carnegie Foundation for the Advancement of Teaching (*q.v.*) as a nonsectarian institution participating in its system of retiring allowances to professors. From its inception, the college has accepted women students, thus (as it claims) beginning on the Atlantic seaboard the movement for the higher education of women. Bates College has kept characteristics due to its history and the circumstances of its founding; fraternities are prohibited; no one "can be a member of the college without taking and keeping a pledge to abstain from alcoholic drinks;" the necessary expenses are low ($206 a year), and many of the students are self-supporting. The old New England custom is kept of encouraging needy students to teach during part of the year. There are many scholarships. Degrees given are A.B., and M.A. to graduates of at least three years' standing. The Cobb Divinity School, after 38 years of existence as a department, was discontinued in 1908. There are 11 buildings valued, with grounds and equipment, at $425,000. The resources have doubled within the past four years, largely through the benefactions of Mr. Andrew Carnegie and of Mr. Bartlett Doe, late of San Francisco. The net income for the fiscal year 1908 was $47,525; gifts from private sources amounted to $66,982. The average salary of a professor is $1480. There are (1910) 461 students, and 22 members on the instructing staff, of whom 16 are full professors. George C. Chase, D.D., LL.D. is president. C. G.

BATES, JOSHUA (1776–1854). — Graduated at Harvard College in 1800; instructor in Phillips Academy at Andover (1800–1803), and president of Middlebury (Vt.) College (1818–1839).

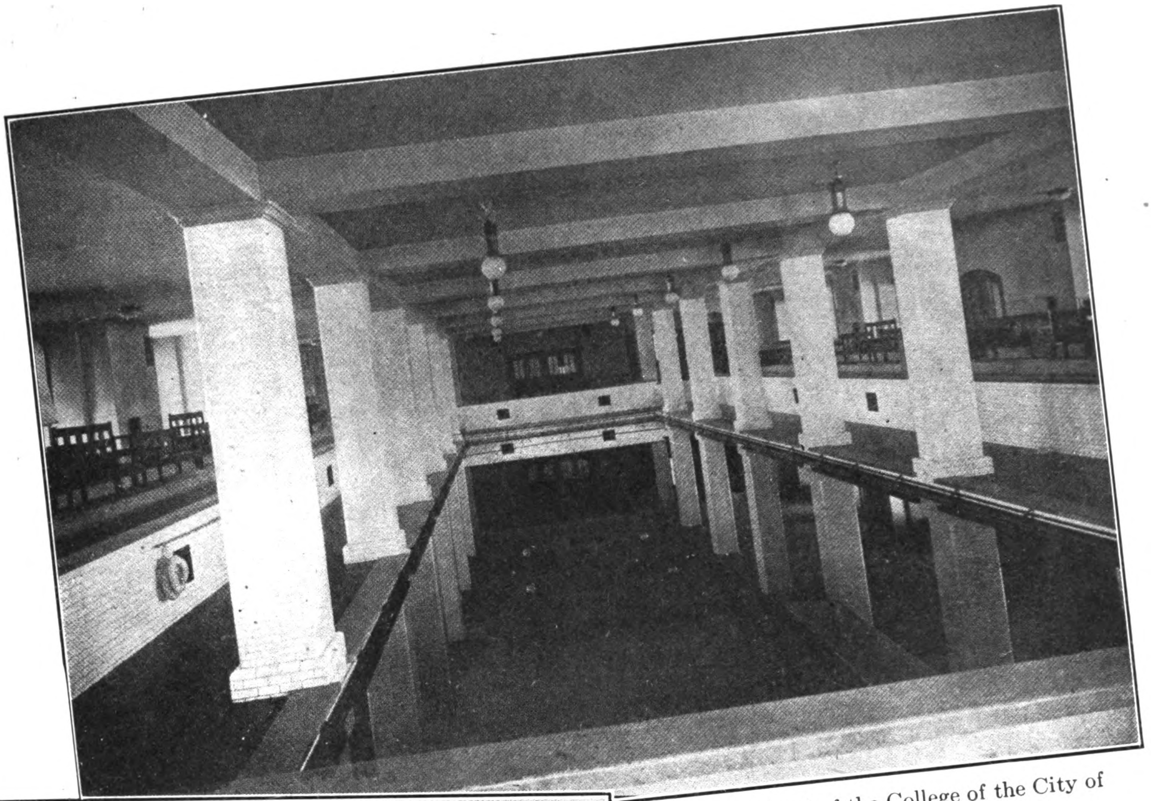
BATES, JOSHUA, (1810–1888). — Educated at Phillips Academy, Andover, and Middlebury (Vt.) College; principal of the schools at Charlestown, Mass. (1833–1844), and of the Brimmer School in Boston (1844–1876).

BATES, SAMUEL PENNIMAN (1827–1902). — Educator and author, educated in the public schools of Massachusetts, at the Worcester Academy, and at Brown University; principal of Academy at Meadville (1851–1857); superintendent of schools in Crawford County, Pa. (1857–1860); deputy state superintendent of public instruction in Pennsylvania (1860–1866); author of *Liberal Education, Methods of Teachers' Institutes, History of Colleges in Pennsylvania,* and of numerous historical works. W. S. M.

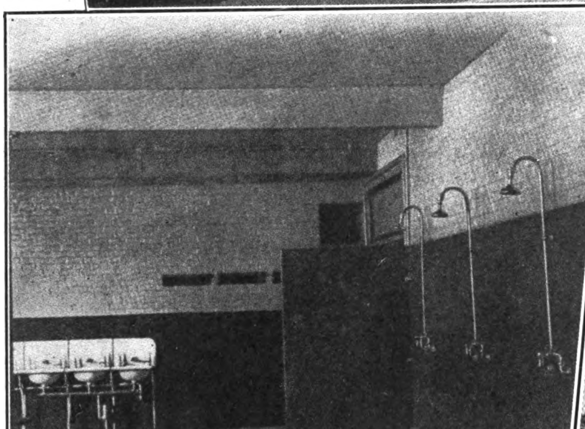
BATHS. — For more than a quarter of a century baths have been a regular part of the equipment of modern school buildings in Europe, and they have long since passed the experimental stage in some American cities. But their general introduction into schools has been delayed longer than could have been anticipated. This tardy recognition is due partly to the fact that home facilities for baths are better and more generally found here than in Europe, and partly to the fact that our general governmental attitude is less paternal. But in the crowded centers of large cities conditions have rapidly become so bad that school and general municipal baths have become necessities for the sake of the public welfare. Outside the large cities comparatively little progress has been made in supplying bathing facilities in grammar schools. But the larger and better buildings for high schools are now being generally equipped with baths. The demand, however, has come in connection with the development of athletics, and physical training in gymnastics. Football, track work, tennis, and such vigorous sports, together with more systematic gymnastic work, have made bathing facilities necessary in buildings for the larger high schools, and it seems probable that similar demands will eventually have to be met in all larger and better grammar schools. Be that as it may, there is now comparatively little demand in smaller cities in connection with public school buildings to supply bathing facilities for all of the pupils in attendance, and the necessity of publicly supervising the bathing of all school children has not yet been reached. In making this statement there is no desire to minimize the need of school baths. Public health and public morals, it may safely be said, would in many parts of the country profit much by the introduction and discreet use of school baths, especially in village and country schools. The greatest need for school baths is at present in the congested districts of large cities, and in the villages and country districts where bathtubs in homes are comparatively rare.

Disregarding all questions of comparative need and matters of local policy and local pride, if a school is to be equipped with baths, what are the requirements? Naturally, the first requisite is a satisfactory water supply. This has been the chief drawback in village and country schools both for the high school and elementary grades. In cities with public waterworks and sewer systems it is a matter of small expense to equip a school with baths. But it is now possible to have regular and adequate water supply in village and country schools by the introduction of the air pressure tank system; windmills and water tanks above ground are impracticable in cold climates and are unreliable anywhere. (See further discussion of this method under LATRINES and URINALS.)

Bathtubs have no place in public school buildings, simply because they are too expensive to install and operate, offer too much opportunity for contagion, require too much attention to keep clean, and take up too much room. Besides, a rain or shower bath is more invigorating and more cleansing than a tub bath, and requires less time. Swimming tanks introduce an element of wholesome exercise and sport not connected with other forms of baths, and are worthy attractions for boys; but they are not practicable in most schools,



Swimming Pool of the College of the City of New York.



Shower Baths in an American Public School.

Bath Room in Public School, Dresden, Germany.

because of the lack of space, the cost of construction, and the great amount of water required. This form of bath has gradually been taken over and developed by clubs of various sorts and by Y.M.C.A. workers. Comparatively few even of the best high school buildings have swimming pools worthy of note. In England this form of bath is much more in evidence in the schools than it is here. The problem, then, of supplying baths in schools narrows itself almost exclusively to shower or rain baths.

In planning to equip a school building with shower baths, the first question to arise is this: where shall they be placed? In small or medium-sized buildings, the best and most convenient place is the basement, if it is well lighted, well ventilated, and safely drained. This location insures privacy, requires less expense for plumbing, introduces less danger to a building, prevents disturbance when baths are taken during school hours, and can be supervised more easily. In large buildings designed for the use of both sexes, it is often better to locate a few on each main floor, and in proximity with the toilets. But, especially for the boys, the basement or some place adjacent to the gymnasium is the most convenient place. In grammar schools, where the younger children take their baths at stated times and according to program, a common open bathroom with a series of showers conveniently placed above shallow but wide basins has proved satisfactory. But where such a common room is used, individual dressing rooms in close proximity are necessary, where the clothing can be left, where a thin bathing trunk can be put on before the bath, and where each pupil can retire to dry his body and put on his clothing. Naturally, for pupils in the upper grades and high schools, separate double stalls are necessary, one with shower attachments, and the other for a dressing room. These can all be located in a common room with common drainage and common heating and ventilation. The floors should be waterproof and laid with white tiles, and the walls covered with the same material to the height of 5 or 6 feet. All other exposed surfaces of the room should be plastered with damp-proof cement plaster. Every bathroom demands as much sunlight as possible, and the drainage should be safely trapped into a sewer, or better still into a separate drain. A separate and special system for heating bath water is necessary, for it is neither safe nor sanitary to use water from either a steam or a hot water boiler which is used to heat the schoolrooms by either direct or indirect radiation.

F. B. D.

BATTERSEA TRAINING COLLEGE, ENGLAND. — An institution for the training of teachers for pauper schools established in 1840 by James Phillips Kay (afterwards Sir James P. Kay-Shuttleworth) and Edward Carleton Tuffnell at their own expense. These philanthropists had been at considerable pains to learn what was done in the same field on the Continent, and had spent some time in visiting the institutions of Fellenberg and Vehrli (*q.v.*). Becoming particularly impressed with the simplicity of life at Kruitzlingen, Vehrli's school, and the high intellectual attainments of the pupils, they decided to model their institution on it. Sir James himself for a time acted as superintendent. Thus Battersea is the first attempt to found a normal school on a Continental model, as opposed to the monitorial system which then prevailed in England. Orphan boys were selected and apprenticed from the ages of 14 to 21 to become teachers. Others were, however, also received on recommendation for periods of at least one year. The founders hoped that in time public attention and support would be attracted to their work, but although grants were given by the government, the burden and the responsibility became too great for two men alone, with the result that the college was transferred to the National Society (*q.v.*) in 1843, and has since remained under its control as a denominational training college for teachers. As to the general relation of the college to the English system of training teachers, see the article on the TRAINING OF TEACHERS, IN ENGLAND.

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BAUER, KARL LUDWIG (1730–1799). — A distinguished German philologist and schoolman. He was born and received his education in Leipzig. In 1766, he became rector of the classical high school (Lyceum) of Hirschberg in Silesia. The graduation examination which he introduced there in 1776 (*Abiturienten-examen*) later on (1788) was made obligatory for all Prussian gymnasia and up to the present time forms a characteristic feature of all the higher schools in Germany. He made numerous contributions to classical philology, among which may be mentioned his standard Latin Dictionary.

BAURIEGEL, JOHANN CHRISTIAN (1773–1850). — An excellent German schoolmaster. Born in Saxony of very poor parents, he started as a servant in the house of Professor Ernesti in Leipzig, but in 1796 came under the instruction of Dinter, who was then privately training young men to become teachers. After receiving an appointment in a country school, he himself started a teachers' seminary which he conducted in addition to his school work, giving from 65 to 70 hours of instruction per week. Besides this, he found time to advance elementary education by a number of valuable writings. He has left an autobiography, *Mein Leben und Wirken* (*My Life and Work*), Neustadt, a.d., Orla, 1847.

BAVARIA, KINDOM OF, EDUCATION IN. — See GERMAN EMPIRE, EDUCATION IN.

BAXTER, RICHARD (1613–1691). — The connection of this eminent dissenting divine (who was one of the earliest and most effective writers of what may be called Christian literature for the people), with the history of elementary education in England, is interesting and important. Born in Shropshire, he was educated at Wroxeter school, and took orders in the Established Church, and was curate at Kidderminster from 1641 till the Restoration, when he was ejected. He was one of the many clergy who were tried by Jeffreys (May 30, 1685). He was imprisoned, but secured his freedom in 1686. At that date he had long been one of the most popular theological writers in England, and it is interesting to recall the fact that his books were to be found in New College, Cambridge, Mass. (Harvard), and are mentioned in Edward Randolph's Report on the College dated Oct. 12, 1676. (See *Calendar of State Papers*, Colonial Series, America and West Indies, 1675–1676, p. 467.) The Act of Uniformity of 1662 operated with great severity on dissenting schoolmasters, and Baxter, who, though a dissenter, was in close touch with the leading Churchmen, made great efforts to secure better terms for the nonconformist teachers. In 1674 Baxter and Dean Tillotson (afterwards Archbishop of Canterbury) drew up a "Healing Act" for a union between conformists and nonconformists, and these proposals included freedom for nonconformists under certain conditions to act as schoolmasters. (For another "Healing Act" of the same type see Lord Somer's *Collection of Tracts.*) The moment that this proposed compromise appeared was important, since all parties recognized that efficient elementary schools for the poor were a necessity. The Courts of Justice had already (1670) in *William Bate's case* (Ventris's *Reports*, Vol. I, p. 41) held that the schoolmaster nominee of a founder or lay patron of a school could not be ejected for nonconformity by the Bishops, and further cases in favor of dissenters were about to be decided. Moreover Gouge's (*q.v.*) schools were already making way in Wales. Baxter's agreement with Tillotson was approved by the leading nonconformists, but it was, unfortunately, not accepted by the Bishops. Nevertheless, it had its effect. The Church gradually from this time onward ceased to insist on its legal rights, and no opposition to the establishment of nonconformist charity schools was made when they began to appear some ten years later (1685). But Baxter's efforts at this time on behalf of education were not limited to his weighty intervention in the general struggle between conformists and nonconformists. Thomas Gouge (*q.v.*) in 1672 had begun (with the permission of the Bishops) his evangelical work in Wales, and Baxter took close interest in this work and brought together both Church and nonconformist forces for the purposes of helping forward this Welsh work. Within a month or two of the compact with Tillotson, in midsummer 1674, a Trust was formed to found schools and distribute Bibles and religious books in Wales. It is pretty clear that the Trust was associated with Gouge's schools. The printed report of the Trust, dated Lady Day, 1675, was signed by Tillotson, Whichcot, Ford, Durham, Stillingfleet, Meriton, Gouge, Poole, and Firmin; while Bates, Owtram, Patrick, Burton, Baxter, Fowler, Griffith, and others also aided the Trust. The fact that the Trust was formed at the same time as the agreement with Tillotson shows that that agreement was intended to help Gouge's schools. Whether this agreement can be connected with the charity schools (*q.v.*) may be doubted, but these various elementary school revivals are clearly all part of one movement.

J. E. G. DE M.

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BAYLOR COLLEGE, BELTON, TEX. — Founded in 1845, for the education of girls and young women, under the auspices of the Baptist Convention of Texas. The admission requirements are not definitely stated, but graduates of approved high schools receive advanced standing in the college. Preparatory, collegiate, commercial, and fine arts courses are given. There are 21 professors and 3 assistants. W. A. Wilson, A.M., D.D., is the president.

BAYLOR UNIVERSITY, WACO, TEXAS. — A coeducational institution, owing its foundation to a movement begun by the Texas Union Baptist Association, which, in 1842, resolved to establish in Texas a Baptist university. The charter was obtained Feb. 1, 1845, from the Republic of Texas; in the same year, the preparatory department was opened at the town of Independence. Other departments were opened later at the same place. In 1868, Waco University, founded in 1861 by Rufus C. Burleson, who had resigned the presidency of Baylor University, passed into the control of the newly organized Baptist General Association. The two universities were united in 1868 under the name of "Baylor University at Waco," and the two organizations of the denomination having been consolidated under the name of "The Baptist General Convention of Texas," Baylor University was placed under the control of this body, which elects the 13 members of the Board of Trustees. In 1897 the Baptist Educational Commission, inaugurated at a meeting of the Baptist General Convention of Texas, put into effect a scheme of correlation for the educational institutions of the denomination in Texas, by the terms of which Baylor University was made the head of the system, and the following colleges and academies were permanently correlated with the university: Baylor Female College, Belton (an institution which confers the bachelor's and master's degrees); Howard Payne College, Brownwood; Decatur College, Decatur; Burselor College, Greenville; Goodnight Academy, Goodnight; and Canadian Academy, Canadian. Baylor University maintains an undergraduate college, admission to which is by examination or certificate from an accredited high school; a preparatory school known as Baylor Academy; a department of Fine Arts, including music and oratory, a Department of Medicine and Pharmacy, at Dallas, Texas; and since 1889 a two months' summer session, which is a regular term of university work and includes a Teachers' Summer Normal School. A department of law was established in 1851, but abandoned after a few years. In general, the present organization of the university seems to be patterned after that of the University of Chicago. There are no college fraternities, but Phi Gamma Delta maintained a chapter from 1856 to 1888, and Sigma Alpha Epsilon from 1858 to 1861. There are 9 buildings, valued, with grounds and equipment, at $800,000, the annual income (1906) was $75,500. The average salary of a professor is $1500. There are (1909) 53 members on the instructing staff, 8 of whom are full professors. The students number 1296, distributed as follows: College, 271; Academy, 343; Medicine and Pharmacy, 80; Summer Session, 314; 606 are women. Samuel Palmer Brooks, A.M., is president.

C. G.

BEALE, DOROTHEA (1831-1906). — An English schoolmistress who made one of the greatest contributions to the movement for the higher education of girls and women in England. After attending a school in England up to the age of 13, she was kept at home, where she entered on a course of wide reading. At the age of 16 she was sent for a year to a school for English girls at Paris. In 1848, she entered Queen's College, London, where she showed a strong interest in mathematics, and was for a time tutor in that subject. In 1857, she was appointed head teacher at the Clergy Daughters School at Casterton in Westmoreland, where she taught a remarkable array of subjects. From this school she resigned at the end of a year, owing largely to a conflict of religious opinions. For a time she remained without an appointment, and spent the interval in writing a history, in social work, in a visit to Germany, where she visited the Deaconesses' Institute at Kaiserwerth, which she described in a small book, and in teaching in a private school. In 1858 an opportunity which she long desired offered itself in the vacancy for a lady principal at the Ladies' College, Cheltenham, which had been founded a few years previously. She was appointed, and entered on a career which has served to make the education of girls what it is at present. From a school with rapidly dwindling numbers under a local board, she succeeded in making one of the most important girls' schools in England, with beautiful and admirably equipped buildings. In place of the numerous girls' schools which devoted their time to the teaching of accomplishments, she was instrumental in leading the way to the foundation of day schools offering what is recognized as a complete secondary education. Several times the Educational Commissions turned to Miss Beale for guidance on the question of the education of girls. Her aim was to secure for girls and women an education for life in the widest sense. To a keen intellect were added a deeply religious spirit and great teaching ability. To her powers as an organizer the large school, St. Hilda's College for the training of secondary teachers (opened in 1885), St. Hilda's Hall, a residence for women students at Oxford, and St. Hilda's East, a settlement in London, bear testimony, for they are all the work of her untiring energy. But her interests were not limited to her school; she was ready to advise on the foundation of other girls' schools and to assist headmistresses of other schools. She was for a time President of the Association for Headmistresses. In 1898, she was elected corresponding member of the N.E.A. In 1902, the Edinburgh University conferred on her the honorary degree of LL.D. Among her works are *A Student's History of English and General History* (1858); a *Chart* (1863) representing historical material in tabular form; *Work and Play in Girls' Schools* (1898); and a *History of the Ladies' College.* Miss Beale remained active at school up to within three weeks of her death on Nov. 9, 1906.

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BEATING THE BOUNDS. — The origin of "Beating the Bounds" of a parish or of certain other areas is lost in the mists of prehistory. We know that curious rites including the sacrifice of animals and even human beings on the boundary stones or marks at one time took place (see Mrs. Green's *Town Life in the Fifteenth Century*, Vol. I, p. 134). From medieval times it has been and is still the practice for the clergy, the church wardens, and the parishioners to perambulate the parish on Ascension Day or the three Rogation Days preceding it. It was in this procession that the connection with schools arose, for it was the practice until comparatively modern times to take the school children on the perambulation and beat them (the beating probably became gradually nominal in more recent times) at the boundaries of the parish in order that such boundaries might be fixed in the children's minds. The fact that children in

Anglo-Saxon times were forbidden to be taught by a priest of another parish may possibly be associated with this (see *Canons* of 960).

J. E. G. DE M.

BEATS. — A resultant rising and falling of tonal intensities which is heard when two tones of similar but not identical rates of vibration are sounded together. Thus if two tones, one of 200 and another of 201 vibrations are sounded together, the resultant tone will be alternately strong and weak one time per second. The strong pulsation, or beat, is produced by coinciding phases of the two sets of vibrations, whereas the weak tone or interval between the beats corresponds to the opposition in phase. Beats are of considerable aid in tuning, measurements of pitch, etc. In the production of consonance and dissonance they play a most important rôle.

C. E. S.

BEATUS RHENANUS, BILD VON RHEINAU. — A humanist of the fifteenth century. Born at Schlettstadt in 1485, he attended the Latin school there, which had been brought to a high standard by Ludwig Dringenberg (*q.v.*). From 1503 to 1507 he studied at the University of Paris, and was strongly influenced by Le Fèvre (Jacob Faber Stapulensis), who lectured on Aristotle's Works. He made an attempt to learn Greek, but the lecturer on that language, though a Greek, was no teacher. In 1608, he went to Strassburg, where he was employed as a proofreader. Here he came into contact with a number of the most famous of the German humanists. Two years later he was attracted to Basel by an opportunity of renewing his study of Greek under Conon, one of the most famous teachers of the day. Here he also acted as proofreader in the printing office of Frobin. In 1514 he met Erasmus, and a lifelong friendship began between the two. Erasmus speaks very highly of his young friend. In an appeal to Pope Leo for support of the edition of St. Jerome he speaks of Beatus Rhenanus as "a young man whose profound learning is equaled only by his exquisite critical taste." In 1515, he dedicated a commentary on Psalm I to him. In 1520 he left his letters to be edited by Rhenanus, whom he calls his *alter ego*. In addition to supervising the publications of Erasmus' works in 1540, Rhenanus was himself a prolific editor and author. Among his editions of the classics are *Plini Epistolae*, 1514, *Tacitus*, 1519, *Tertullian*, 1521, *Velleius Paterculus*, 1522, *Livy*, 1535. He also wrote a history of Germany in three books (*Rerum Germanicarum libri tres*). Rhenanus enjoyed the friendship of the humanists who centered round Schlettstadt, Strassburg, and Basel. He died at Strassburg, in 1547. In connection with Rhenanus it is interesting to notice that his library, which he bequeathed to the Council of his native town, remains treasured almost intact in the library of Schlettstadt. An added interest attaches to the collection because the development of the interests and the course of reading pursued by Rhenanus can be traced from the dates which are inscribed on his books.

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NICHOLS, F. M. *The Epistles of Erasmus.* (London, 1904.)

BEAUMONT COLLEGE, HARRODSBURG, KY. — A school for girls and young ladies, known from 1856 to 1893 as "Daughters College." Students are admitted by certificate from creditable institutions or by examination, the requirements for the college being equivalent to about 4 or 5 points. Primary, preparatory, and collegiate departments are maintained. Four literary and five musical courses are offered, on completion of which degrees are conferred.

BEAUVOIR COLLEGE, WILMAR, ARK. — A private coeducational institution, founded in 1903. Primary, preparatory, and collegiate, fine arts and commercial departments are maintained. Students may enter the college after 8 years of primary work. The majority of the pupils are in the preparatory department. There are 16 instructors on the faculty.

BEAVER COLLEGE, BEAVER, PA. — An institution for the education of young women, opened in 1853 as "Beaver Seminary"; the majority of the trustees are of the Methodist Episcopal Church. College preparatory, college, and fine arts departments are maintained. The admission requirements would be equivalent to about 12 points. Certificates from approved schools are also accepted. Men are admitted only as special students. There is a faculty of 18 members.

BEC. — The site in the eleventh century of the most famous abbey and school in Europe, the seat of the teachings of Lanfranc and Anselm. The ruins may still be seen near Brionne, in the department of Eure. Bec was as remarkable a monument to Norman energy in the ecclesiastical and literary sphere as the conquest of England in that of military, political, and administrative efficiency. Greek had been almost forgotten in the west, but Anselm was familiar with many of the opinions of the Greeks, inquired for Greek writings, and used Greek titles for some of his works. No Greek book, however, is mentioned in an extant catalogue of the monastic library of Bec of about 1164. It is probable that Bec was one of the few seats where law continued to be taught during the Dark Ages, and that Lanfranc, for example, lectured in law. Theobald, who became Archbishop of Canterbury, is known to have pursued his studies at Bec, and was instrumental in promoting the study of the Roman law among his personal retinue of clerics. Bec was rather liberally disposed toward the classical studies, and Étienne of Rouen, who taught at the abbey toward the close of the twelfth century, defended this position by an appeal to the example of the Fathers. The abstract made by Étienne of Quintilian's *Institutes of Oratory* for his pupils at Bec is still preserved in the Paris Library as the *Codex Pratensis*. P. R. C.

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Chronicon Beccensis abbatiae ab ipsa fundatione ad an. 1467, in Lanfranc, Opera, Migne. (*Pat. Lat.* Vol. 150.)

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BECHER, JOHANN JOACHIM (1625–1682). — A German economist, chemist, and pedagogical writer. Born in Speyer, the son of a Lutheran pastor, he early lost his father, and studied, chiefly in an autodidactic way, theology, mathematics, medicine, chemistry, and politics. Being obliged to support himself by tutoring, he also gave attention to the methods of teaching. In 1660 the Elector of Mainz appointed him court physician and teacher of medicine. Subsequently he entered the services of other German princes, such as the Electors of the Palatinate and of Bavaria, and, in 1666, became a "Councilor of Commerce" at the imperial court at Vienna. He traveled extensively in Holland, England, and Scotland, and died (1682) as a poor man in London.

Becher is one of the most remarkable men of the seventeenth century. Always full of ideas, schemes, and projects, he combined an encyclopedic knowledge with many-sided practical interests. In the history of chemistry, he stands as the originator of the first consistent, although incorrect, theory of chemical action. The processes of burning and of the calcination of metals were explained by him on the supposition that these substances contained a combustible element of which they became deprived on ignition. These doctrines, further developed by Stahl (1660–1734), constituted the famous phlogistic theory, which dominated chemistry until toward the close of the eighteenth century.

As an economist, Becher was imbued with the ideas of his age, which were represented by the policies of Colbert, the great minister of finance of Louis XIV. He was a thorough believer in the absolute power of the State, the encouragement of home industry, and the improvement of commerce.

The producing classes, farmers, artisans, merchants, he regarded as the backbone of the State. Like Bacon, he considered the object of science to be the improvement of the state of society. He himself made a number of useful inventions, such as an improved weaving loom, a knitting machine, and others. He also imagined to have discovered a method of commuting the baser metals into gold. Among the schemes which he conceived was the project of a German West India company, for which he succeeded in obtaining from the Dutch government a grant of 3000 square miles of land between the rivers Orinoco and Amazon. In accordance with his economic views are his educational ideas, which strike us as exceedingly modern. They are contained chiefly in his *Methodus Didactica*, a short treatise written in 1667. There we find the first demand for special schools for the preparation of manufacturers and merchants. Becher was also the first to separate religious education from general instruction and to put both under the control of the State. His complete plan of a school organization makes provision for an elementary school as a common foundation, followed by a Latin school with a 3 years' course, a school of mechanic arts, and a "philosophical" school which was to give a more extended scientific and technical training. He also develops the plan of a *theatrum naturae et artis*, a natural and technological museum.

He was interested in female education, as well as in the education of neglected children. On the model of workhouses and orphan asylums which he had observed in Holland, he organized such an institution in Vienna in 1671. F. M.

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HEUMANN, ALFRED. *Becher*, in *Monatshefte der Comenius Gesellschaft*, Vol. IX.

BECKER, KARL FERDINAND (1775–1849). — A German philologist, the chief representative of the philosophical school of language teaching. He was born in Liser, Rhine province, studied for 2 years at the priests' seminary in Hildesheim, became a teacher at the age of 19, but later on (1799) took up the study of medicine in Göttingen, and began to practice in 1803. In 1814 he became the director of several military hospitals in Frankfort-on-the-Main, and in 1815 he settled as a physician in Offenbach, where, 8 years later, he opened a small private school which he directed until his death. The instruction which he gave led him to resume the linguistic studies which had occupied him as a teacher early in his life. He first published his work on *Deutsche Wortbildung* (*German Word-Formation*), 1824, which was followed by his *Organismus der Sprache* (*Organism of Language*), 1827, *Ausführliche deutsche Grammatik* (*Complete German Grammar*), 1836–1839, and *Der deutsche Stil* (*German Style*), 1848, as well as by numerous textbooks and other writings. Although he was at the age of 50 when he resumed his linguistic researches, his work showed great vigor and originality. He looked upon language as an organic product of the human mind, and thought that its laws could be studied by the deductive-logical method. His system, which was skillfully adapted for the purposes of the elementary school by Wurst and Honkamp, for a time dominated the grammatical instruction in Germany, both with regard to modern and classical languages. It commended itself by its clearness and its insistence on the self-activity of the pupils, but it was opposed, by Diesterweg among others, because it was too rigid and formal, and made too great demands on the logical powers of the young mind. Scientifically, Becker's deductive method of language study has been superseded by the far deeper and more fertile inductive method of the historic school, represented by such names as Herder, Wilhelm von Humboldt, Bopp, and Jakob Grimm; nevertheless, much of his work, especially on the syntax and style of modern High-German, is still of very great value to the teacher. F. M.

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BECKINGTON, THOS. — See Eton.

BEDALES. — A private experimental boarding school of the "new school" (*q.v.*) type, founded in 1892 by Mr. Badley; now located near Petersfield, Hants. Interest to the general student of education centers in the experiment in coeducation, which is by no means considered an experiment by the school itself. About a third of the 150 students are girls. The general rule seems to be to bring the two sexes together in schooling and other relations where this seems to prove an advantage to both, but also to provide opportunity for separate activities when such are needed. There is a definite inclusion of household and farm activities among the educational means, and the courses in biology, chemistry, and physics take account of these interests. The modern movement in mathematics seen at its best in England has had its influence, and, in place of the material still so commonly found in American schools during early adolescence, students are brought naturally and profitably into higher mathematics by 14 or 15 and even earlier. These larger inclusions are suggestive of the wide range of activities. Each student has a course well within his powers, but has the advantages of (1) a choice of subjects not usually counted as associates in the ordinary curriculum, and (2) association with other students working in other lines beyond his own. Thus a student preparing for architecture was at 17 doing superior work in the excavation of near-by Roman villas and baths under the direction of the head of the classics department, and also had charge of planning and building the stable erected by the boys for the horse they had bought to keep their grounds for sports in order. F. A. M.

See Abbotsholme; Boarding Schools; Deutsche Landerziehungsheime; L'École des Roches; New School.

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BEDE (BAEDA). — The famous Bede, known from the ninth century onward as the Venerable, was almost beyond doubt born in the year 673, and almost as certainly died on the 26th of May, 735, though Mayor and Lumby give some grounds for thinking that it may have been as late as May 9, 742. He was born on the land belonging to the twin monastery of Wearmouth and Jarrow, founded in 674, with Jarrow added in 681 or 682. At the age of 7 he was sent to the Monastery of Wearmouth, to be brought up in religion under the famous Abbot Benedict Biscop (*q.v.*). In 681 he passed to Jarrow with its new Abbot Ceolfrid, fellow-laborer of Biscop, and at Jarrow his whole life of spiritual and intellectual activity was spent. At 19 he became deacon, and in 702 he was ordained priest by John, Bishop of Hexham. Bede's life as a student was spent in the most favorable surroundings that that age and country offered. Biscop in addition to pictures, furniture, and relics, brought to the monastery in the course of his five visits to Rome a vast store of books. (See Bede's *Vitae Abbatum.*) He also brought books from Vienne, and on a sixth visit to the Continent he devoted himself to the collection of books, including classical works (Sandys, *History of Classical Scholarship*, Vol. I, p. 468, 2d ed.). Bede was in the heart of culture, and Alcuin tells us of his diligence as a student. He became an excellent scholar, with some knowledge, at any rate, of Greek and possibly of Hebrew, and showed skill in Latin verse. He frequently quotes Cicero, Virgil, and Horace and, "doubtless at second hand," Lucilius and Varro. He was familiar with Jerome's edition of Eusebius, with Augustine and Isidore. His training at Jarrow made him not only a scholar, but a historian of the first rank. He uses his material with skill and judgment, and is an authority of the most reliable character. His long, happy, and arduous life of teaching and writing at Jarrow was apparently only broken by two short visits, one to his former pupil, Egbert, Archbishop of York, and founder of the famous School of York, which through its most distinguished disciple Alcuin (*q.v.*) gave life to the culture of the Middle Ages, and another to Lindisfarne for the purpose of gathering material for the life of Cuthberth. His literary activity lasted from the age of 30 till his death. On his deathbed he was engaged in the translation into Anglo-Saxon of the Gospel of St. John, and one of the most striking passages in English literature is the famous letter of Bede's disciple and pupil Cuthberth to Cuthwine describing the scene. But he also wrote much on particular books of the Old Testament and of the New Testament; the lives of various saints; the *Lives of the Abbots* (Benedict, Ceolfrid, and Huaetberht) of Jarrow, *A Martyrology*, and his immortal *Historia Ecclesiastica gentis Anglorum* (731), in five books. Nor did his restless pen cease with these labors. He was at heart a teacher, and from him sprang in a direct line the later scholarship of France and England. He made his own textbooks; he wrote in addition to the work on meter, a *Book of Hymns* in varying meters; a *Book of Epigrams* in heroic or elegiac verse, works *On the Nature of Things* and *Of the Times* and an elementary textbook of *Orthography* arranged in alphabetical order. His is, and always will remain, one of the greatest names in the history of English culture. His *Ecclesiastical History of the English* has considerable importance to the student of the history of education. A large part of the knowledge of the history of education in England before the eighth century is obtained from this work. As instances may be mentioned the following significant indications of the state of education in early England. In *E. H.* III, 3, Bede gives an account of Adrian's school founded in 635 on Lindisfarne for English children as well as their elders, which shows the combined influences from Ireland, Gaul, and Kent before the arrival of Augustine. These influences were exercised by the Irish scholar Fursa, and the Kentish Bishop Felix, who assisted Sigbert, King of East Anglia, in founding a school for boys, which stood in almost direct relation to the Roman Imperial Education referred to in Gratian's Edict of 376. In Book IV, 8, there is a reference, the only one on the subject before the canon of the Council of Cloveshoo (*q.v.*), to the education of young boys in nunneries, a practice which continued for many years (see papers on the Medieval Education of Women in England, *Journal of Education*, June, 1909, supplement). The importance of Ireland as a University for England and as the training college of Europe about the middle of the seventh century is noticed by Bede. One other reference to Bede's information on the history of education and culture must suffice. He tells us (IV and V) that Theodore and Adrian after 669 gathered "a crowd of disciples" and taught them not only Holy Scriptures but also the metrical art, astronomy, and ecclesiastical arithmetic. "A testimony whereof is, that there are still living at this day some of their scholars, who are as well versed in the Greek and Latin tongues as in their own, in which they were born," men such as Tobias, Tatwine, and Albinus. "The tradition of Greek," says Dr. Sandys, "descended to the early days of Odo (875–961), Archbishop of Canterbury." As part of the church service it lasted still longer. Bede tells us also something of the collection and circulation of books in his time and of the close educational touch kept with Rome. This ecclesiastical history is a necessary volume to the student of the history of education in Europe. J. E. G. de M.

BEECHER, CATHERINE ELIZABETH (1800–1878). — Daughter of Lyman Beecher, and a pioneer in the movement for the higher education of women in the United States, was born at East Hampton, Long Island, Sept. 6, 1800. She was educated under private tutors and at the Litchfield Academy. Her knowledge of domestic science and its educational value was due to the fact that she was "the eldest of 13 children, all but two trained to maturity, and most of them in a good degree under my care through infancy and childhood," as she tells in her reminiscences. She began teaching at 20, and soon worked out and published an arithmetic for beginners. In 1828 she founded the Hartford Female Seminary, which for many years was the leading institution in America for the higher education of women, and the prototype of many similar institutions of a later date. Mrs. William C. Woodbridge and her sister Harriet, afterwards Mrs. Calvin E. Stowe, were associate teachers in the Hartford Seminary. At a later date she organized a similar seminary at Cincinnati. For many years she traveled through the South and West lecturing upon educational subjects and stimulating interest in the higher education of her sex. Because of her wide acquaintance with the educational conditions of the country she was called upon to supply many teachers for the schools of the West; and at one time she contemplated the organization of a college for the training of teachers at Cincinnati. Her books on domestic science were the first of their kind published in America. In 1852 she organized the Woman's Education Association, "to aid in securing to women a liberal education, honorable position, and remunerative employment in their appropriate professions by means of endowed institutions on the college plan of organization — these institutions to include all that is gained by normal schools and also to train women to be healthful, intelligent, and successful wives, mothers, and housekeepers." The chief problem in the education of women, as Miss Beecher saw it, was for the education of the needs of the family, hence the large emphasis which she placed on the study of domestic science. She was active in the Western Literary Institute and the American Association for the Advancement of Education (*q.v.*), and was probably the first woman who participated in the proceedings of national educational associations. She contributed largely to the best educational literature of her day. Among her books, besides textbooks on arithmetic and mental philosophy, are *Suggestions on Education* (1832), *The Moral Instructor* (1838), *Physiology and Calisthenics* (1856), *Religious Training of Children* (1864), and *Woman's Profession as Mother and Educator* (1871). She died at Elmira, N.Y., on May 12, 1878. W. S. M.

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BEECHER, EDWARD (1803–1895). — Son of Lyman Beecher and brother of Catherine E.; educated at Yale College and the Andover Theological Seminary; for several years he was tutor at Yale, and for 14 years president of Illinois College (1830–1844); subsequently he was professor in the Chicago Theological Seminary. W. S. M.

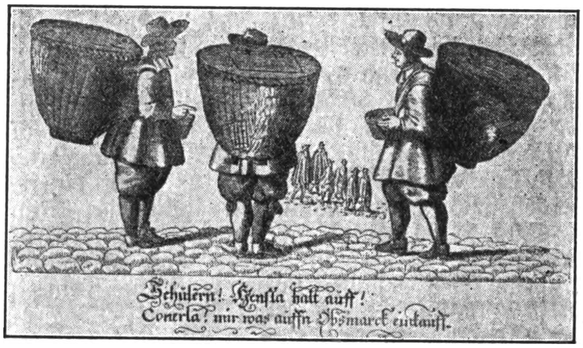
BEECHER, LYMAN (1775–1863). — Educator, graduated from Yale College in 1797; he was active in the improvement of the rural schools of Connecticut; was one of the founders of the Connecticut Education Society, and for 20 years he was president of the Lane Theological Seminary (1832–1852). Four of his children — Catherine E., Edward, Harriet, and Thomas K., — were also identified with the educational work of their day. W. S. M.

BEECHER, THOMAS KINNICUT (1824–1900). — Schoolman, son of Lyman Beecher, was graduated from Illinois College in 1845; engaged in secondary school work in Connecticut and Pennsylvania for a number of years, and contributed numerous articles to the educational journals. W. S. M.

BEGGING STUDENTS. — During several of the latter centuries of the Middle Ages it was permissible and even customary for students of all grades to support themselves by begging, or at least upon the gifts of food or money given by the people freely or upon solicitation. The sanction of the Church given to mendicancy, as well as its constant approval of generosity as the chief Christian virtue, had much to do with the widespread adoption of this method of life by the student. The custom of begging was closely connected with the migratory customs of the students, again stimulated, if not sanctioned, by the examples set by the Church. Indeed, all classes in society were influenced by these same customs. The merchant led a migratory life in pursuit of his business; the craftsman in the completion of his mastery of his trade as a journeyman; the knight went in constant pursuit of adventure, gain, or warfare; the pilgrim had the blessing of the Church, the monk passed continuously to and fro on official journeys or penances; students were drawn to the centers of learning from most remote quarters, and went from school to school in quest of learning, of a more renowned teacher, of scholarships or bursaries, of a patron or a more generous community, of gain, or of the mere love of travel or the knowledge to be gained by it. The wandering priest was the forerunner of the wandering and begging scholar. As early as the fifth century, synods and bishops attempted to control the evil of the number of unattached priests who lived by begging. The coming of the friars in the twelfth and thirteenth centuries gave great encouragement to these customs, especially among students, who in general shared the favors of Churchmen.

In the medieval universities all classes were represented, but a large proportion of the students were very poor. In some universities a special hall or dormitory (the *domus pauperum*) (*q.v.*) was provided for them. At the Oxford halls a special table was usually provided for them, as they must first wait upon the students at the other tables. Street begging was permitted at Oxford by license of the Chancellor. Frequently university or college statutes provide regulations for this custom.

Such a life came to be adopted by many through preference, and was often persisted in for years. A secret society known as Goliards (*q.v.*) was developed. The general character of the life of the wandering student is discussed under these titles.


Schülern! Henſla halt auff!
Conerla! mir was auffn Obsmarck einkauſt.

Begging Students of the Middle Ages.

The begging customs were carried down into the lower schools as these came to be developed under church or town or later Renaissance influences. Here the older boys, bacchants (*q.v.*), adopted little boys, shooters (*q.v.*), as apprentices, — apprentices not only to learning, but to begging, to the *Wanderlust*, and often to vice. The number, importunities, and unlicensed conduct of these students led to the attempt to regulate them by city ordinance in the later medieval centuries. Schools were permitted to send out students or solicitors only at certain hours, in a limited number, and within restricted districts — usually the parish The illustration given is that of the Nuremberger students of the sixteenth century each carrying a huge basket identified by the picture of the patron saint of the school.

The development of state systems of schools in the Germanic countries, where these customs were most prevalent, tended to eliminate this custom, though survivals of it in the singing of pupils from door to door on given feast or holidays. yet persist.

See BACCHANTS; GOLIARDS; WANDERING STUDENTS.

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BEGINNING READING. — A term applied to the group of special methods employed in teaching beginners to read, during the first school year. Sometimes spoken of as "first year reading" or "basal reading." See READING, TEACHING BEGINNERS. H. S.

BEHAVIOR. — In its broadest sense the term is applied to all forms of animal activity. There is a tendency, however, to restrict the term to complex organized forms of reaction. Thus we speak of the behavior of an animal in stalking its prey or extricating itself from a trap. The importance of the reactive side of nervous processes has been reiterated in all recent discussions of behavior. Professor James goes so far as to define education as a process of training behavior. C. H. J.

See REACTION.

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JAMES, W. *Talks to Teachers.* (New York, 1899.)

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BELFAST, UNIVERSITY OF. — Established in 1849 as Queen's College, a constituent body of the Queen's University, which in 1879 became the Royal University of Ireland, with power to grant degrees to students not educated at any college. Queen's College, Belfast, was the most successful of the three colleges. But an agitation was for a long time continued for the establishment of local universities in Ireland, resulting in the Irish Universities Act of 1908, by which Queen's College, Belfast, was converted into the Belfast University. Faculties of arts, sciences, medicine, and law are maintained. In 1907–1908 there was an enrollment of 406 students, of whom the majority were in the medical school. See IRELAND, EDUCATION IN.

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BALFOUR, G. *The Educational Systems of Great Britain and Ireland.* (London, 1903.)

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BELGIUM, EDUCATION IN. — **Political Organization of the Kingdom.** — *A constitutional monarchy.* — Area, 11,373 square miles; population (census of 1900), 6,693,548; estimated 1907, 7,331,756. The executive and legislative powers vested in hereditary King, Senate, and Chamber of Representatives.

The divisions of the kingdom for local government are provinces (9) and communes (2629, census of 1900), both of which enjoy a large measure of autonomy. The affairs of the former are administered by a governor appointed by the King, a provincial council (elected), and a permanent deputation consisting of the governor and six members of the council chosen by that body.

Three distinct authorities participate also in the administration of the commune; an elected council, a burgomaster appointed by the King from the members of the council, and a body of aldermen (*collège échevinal*), consisting of the burgomaster and from two to five members of the council chosen by that body. The council, which represents the people directly, is the principal source of authority in communal affairs (law regulating provincial and communal organization, March 30, 1836, and modifying laws, 1838, 1842, 1848, 1860, and 1865).

In three provinces lying along the border of France, — *i.e.*, Hainault, Luxembourg, and Namur, — and also in Liège, a central province, French or Walloon is the prevailing language. In Antwerp, Brabant, East and West Flanders, and Limbourg, the Flemish or Dutch language prevails.

Belgium is preëminently a Catholic country. Protestants and Anglicans number only about 27,900 and Jews 13,200. The census of 1900 gives 37,905 (men 6237, women 31,608) members of religious orders. As regards language, the census of 1900 shows that 42 per cent of the population spoke Flemish only and 38.2 per cent French only.

Underlying Principles of the System. — The history of Belgium as an independent kingdom dates from 1830, and by the constitution promulgated the following year "liberty of teaching" was adopted as a fundamental principle of education in the new kingdom. "Instruction," says Article 17 of the constitution, "shall be free, all prohibitory measures are forbidden; the suppression of abuses is regulated solely by law. Public instruction given at the cost of the State is equally regulated by law."

This impartial provision sufficed for the time to prevent conflict between the two opposite forces that sought to direct the educational interests of the country. Through all changes of empire, the people of this kingdom had been loyal to the Church of Rome, and submitted, as a rule, to clerical control of education. But from a very early period, individual communes had claimed and secured the right to independent action in this matter. Thus in 1192 the citizens of Ghent secured the sanction of their count for full liberty in the matter of instruction, and about the same time a similar privilege was obtained by Ypres. In 1320, the request of the citizens of Brussels for more schools having been refused by the ecclesiastical authorities, the citizens proceeded without their authorization to open schools and appoint teachers. In 1426 the magistrate of Brussels opposed the establishment of a university in the city, since the students would not be subject to the civil authority, and the university was therefore opened at Louvain. The effects of this freedom were seen in the diffused intelligence and love of learning on the part of the citizens of the chief towns, and even of the villages, as testified by many authorities.

The writings of Voltaire and Rousseau were published at Brussels in 1774 and freely circulated in Belgium, and the *Journal Encyclopédique*, founded at Liège in 1756 and published at Brussels in 1759, had made these cities centers for the discussion and diffusion of the ideas of the French Encyclopedists (*q.v.*). By the peace of Lunéville, 1801, the province was included within the limits of France, and, after the fall of Napoleon, it was united with the Northern Netherlands. Although this union was hateful to the southern province, it increased therein the spirit of communal independence, and familiarized the leaders, also, with the workings of the admirable education law of the northern province, passed a few years before the Union (1806). By the previous union with France, Belgium had been brought within the operations of Napoleon's University, and was thus supplied with the machinery of an educational system which was modified in important particulars from the relation with Holland. All these currents of influence and authority met in the newly formed kingdom, and have played their part in the development of the present system of education. Many of the administrative features of the system, as in the case of the French system, are derived from the Imperial University. In Belgium, however, there is the form without the spirit of centralization.

Present Administrative Organization. — The Minister of the Interior was formerly charged with the interests of public instruction, but these have been recently transferred to the Minister of Science and Art. The chief educational officials under the minister are two general directors, one for primary instruction, the other for secondary and superior. A corps of inspectors is attached to the central administration comprising, for secondary instruction (*enseignement moyen*), one general inspector and two ordinary inspectors, one for the humanities, the other for mathematics and the sciences; and for primary instruction, one or more principal inspectors in each of the nine provinces of the kingdom, under whom are subordinate cantonal inspectors. The deliberative councils (*conseils de perfectionnement*), one for each of the three departments of the system, are formed by appointment from the official and professional bodies. They deliberate upon scholastic affairs submitted to them by the minister, but have not the judicial functions of the French councils. The minister has little direct authority over schools, but he exercises great influence through the control of the government appropriations for education, the regulation of programs, and the appointing power which he possesses. Under present conditions this influence is naturally used to strengthen the clerical control of education.

Department of Primary Education. — *Legislative Measures.* — The principle of communal independence is firmly established in school administration; but on account of the influence of the Catholic clergy in local affairs and the spirit of ecclesiastical subordination, the Church has actual control of primary schools in the majority of the communes. Against this powerful monopoly, the Liberals wage incessant warfare. The prolonged and bitter contest between the two parties has been marked by a succession of laws which have enlarged or restrained clerical control of the schools, according to the purposes of the party in power.

Broadly speaking, the Clerical party advocates a high degree of communal independence in respect to the classes of schools that shall be recognized, and their administration and conduct. This policy shaped the law of 1842, the first law pertaining to primary education in Belgium, and the laws of 1884 and 1895, by which the system of primary education is at present regulated; the Liberals, on the contrary, are earnest advocates of a system of free secular schools under state supervision; the abolition of ecclesiastical inspection of schools; and the restriction of the teaching service to native Belgians trained in state normal schools or possessed of state diplomas. These were the principles embodied in the law of 1879. The law of September 20, 1884, renewed the main provisions of the law of 1842. Religious instruction was, however, left optional with the communes; but the teaching service was again thrown open to naturalized foreigners, thus giving large opportunity for the employment of members of the religious orders, irrespective of nationality. The official program of primary studies, though much abridged from that recognized by the law of 1879, was not reduced to the meager limits of the earlier law. Finally a law of 1895 made religious instruction once more obligatory. It was ordered that the clergy should have free access to the primary schools and to the normal schools, to give, or to supervise, the religious lessons, arrangements being made for the withdrawal of dissenting children. The provision of the earlier law with respect to the adoption of parochial schools was continued, and a third class of schools was recognized, namely, private schools not giving religious instruction, and not subject to communal inspection. If such schools meet the government requirements, they may share in the state appropriations.

The principle of state obligation for the training of teachers upon which the Liberals had insisted was discarded by the law of 1884, which authorized the State, provinces, and communes to establish normal schools in such numbers as circumstances might require, and provided that private normal schools might receive grants from the public treasury upon the condition of submitting to official inspection.

This extreme measure was opposed, not alone by the Liberals, but by moderate Catholics, also, on the ground that it violated the religious neutrality of the State and the rights of conscience, guaranteed by the constitution. Furthermore, it was urged that the powers conferred upon the clergy by the law infringed upon the rights reserved to the communes by law of March 30, 1836, which antedates all school legislation in Belgium. This law expressly declares that the *collège des bourgemestre et échevins* (mayor and aldermen) in each commune shall "administer, direct, and supervise all communal institutions." The influences in favor of the law were, however, too strong to be overcome, and its passage, for the time being, has transferred the struggle for the control of schools to the communes in which the Liberals are powerful.

The passage of the Liberal law of 1879 was followed within two years by the opening of private clerical schools in 1936 communes and the withdrawal of 1500 teachers from the public schools to take positions in the new schools; the law of 1884 was followed by the suppression of about 800 public schools, the reduction of the teaching force in others, the diminution of many salaries, and the serious crippling of the public normal schools. The danger of such retaliatory measures under a change of political parties has been somewhat lessened by a clause in the law of 1895, providing that no communal school or teaching position shall be suppressed without authorization from the central authority, and, further, that no teacher's salary shall be reduced during his term of office in any one commune.

Supervision, Central and Local. — The central government simply maintains inspection of primary schools with reference to the conditions required for obtaining the annual appropriation, namely, sufficient accommodation, approved buildings, and the maintenance of the obligatory program.

In each commune of the kingdom there is an education board composed of members of the communal council, the burgomaster, and aldermen (*échevins*). The board establishes public schools, appoints teachers, determines their salaries subject to the legal requirement as to the minimum, and practically controls the schools.

The commune has its local inspectors, and a committee on school attendance whose duty it is to ascertain how many children between the ages of 6 and 14 reside within the district, and to take measures for securing their attendance. There is no compulsory provision in the school law.

The governing bodies of the *écoles adoptées* are generally formed on the nomination of the chief clergy of the diocese and influential Catholic laymen. These schools preserve their religious character, and perfect freedom respecting the choice of books and methods and the appointment of teachers, subject only to the conditions of the law of 1884 and 1895, and to the assent of the commune, which may at any time cease to recognize the adopted school for satisfactory reasons. A special class of local inspectors is appointed by the ecclesiastical authorities to supervise the religious instruction. These inspectors are required to join the other officials and teachers in the quarterly reunions for interchange of experience and the discussion of methods and principles of education.

Obligatory Studies. — In addition to religious and moral instruction, the program of obligatory studies for primary schools includes the following subjects: reading, writing, elements of arithmetic, the legal system of weights and measures, the elements of the French language, of the Flemish or the German, according to local requirements, geography, history of Belgium, elements of drawing, singing, and gymnastics, needlework for girls, and for boys, in the rural districts, elements of agriculture. The number of schools omitting any of the above is reported each year, and the statistics indicate a steady increase in the number giving the full course. A fair proportion of primary schools offer in addition one or more optional branches. These are designated as schools with developed programs (*écoles primaires à programme développé*). The ambition of pupils is stimulated by the annual public examinations (*concours*) of the higher classes of primary schools, in which both communal and subsidized primary schools must participate. The enthusiasm of teachers is also excited by the hope of the decorations conferred by the government for special merit. These awards are the civic cross, first and second class, and civic medal, first and second class.

Text-Books. — The communal councils generally select the text-books to be used in the schools from a list approved by the official council (*conseil de perfectionnement*). The selection is not, however, absolutely limited to the list. The text-books for religious and moral instruction are selected solely by the ecclesiastical authorities.

School Fees. — The communes are at liberty to charge fees, and in country places they sometimes do so; but in every commune provision must be made by which the children of indigent parents may be taught gratuitously. There are throughout the country *bureaux de bienfaisance*, or local boards for the administration of charity, and the law requires that out of the funds administered by these bodies the fees of poor children, wherever fees are exacted at all, shall be paid. In fact, the primary schools are generally free; in Brussels and other principal towns, invariably so.

Teachers. — The classes of teachers recognized by the law, and the minimum salary for each class, are as follows: —

Classes of Teachers	Salaries							
	Principals				Assistants			
	Men		Women		Men		Women	
	Frs.	$	*Frs.*	$	*Frs.*	$	*Frs.*	$
Fifth class, communes of 1500 inhabitants or less . . .	1200	240	1200	240	1000	200	1000	200
Fourth class, communes of 1501 to 10,000 inhabitants .	1400	280	1300	260	1100	220	1100	220
Third class, communes of 10,001 to 40,000 inhabitants . . .	1600	320	1400	280	1200	240	1100	220
Second class, communes of 40,001 to 100,000 inhabitants . .	1800	360	1600	320	1300	260	1200	240
First class, communes of more than 100,000 inhabitants . .	2400	480	2200	440	1400	280	1200	240

The commune must also provide a residence for the teacher or an indemnity for the same ranging from $40 to $160 annually.

Teachers have the right to a pension upon the same terms as members of other branches of the civil service. They may demand the pension at 55 years of age, or be retired with pension at 60. The amount of the pension is calculated for each year of actual service at the rate of one fifth of the average salary received for the last five years in the service.

Sources of Support. — Primarily the commune must bear the cost of elementary education. The State and the province grant subsidies only when the commune has contributed a sum equal at least to the proceeds of four centimes additional to the direct tax. Since, however, the poorest communes may receive special assistance, the government appropriation is seldom forfeited.

Statistics of Primary Education. — In 1907, the latest year covered by an official report on the subject, there were in Belgium 7291 primary schools under state inspection, of which 4598 were communal and 2693 adopted. About one third the total number of schools were coeducational. The enrollment in all primary schools was 897,000 pupils, distributed as follows: in communal schools, 509,418 (319,315 boys; 190,103 girls); in adopted schools, 218,464 (71,535 boys, 146,929 girls); in private (chiefly parochial) schools, 169,118 (61,419 boys, 107,699 girls). In other words, 56.7 per cent of the pupils were in schools maintained and managed directly by the communal authorities; at the beginning of the decade the proportion was 63 per cent. Of the total number of pupils 845,793, or 94 per cent, paid no fees.

The teaching staff of the public primary schools numbered 19,786 (8904 men, 10,280 women, and 602 not classified by sex). Of the total number nearly one third, viz., 6039 (745 men; 5294 women) were members of religious orders.

There were also 2918 school gardens (infant schools) with an enrollment of 266,365 children. The continuation classes for adults were attended by 213,045 persons, including 118,904 in the classes for young men; and 94,141 in the classes for women. Nearly two thirds of the adult pupils were in adopted (*i.e.* subsidized) schools or classes. These, as a rule, are under clerical management.

The number of normal schools was 54. Of these, 13 (7 for men; 6 for women) were state schools; 2 were communal, and 41 (12 for men; 29 for women) were adopted schools under ecclesiastical control. The number of students in training was 4806, and the number who received diplomas in 1907 was 1018.

The 16 institutions for the blind and the deaf-mute — 7 for men, 7 for women, 2 for both sexes, all subsidized by the State — had an enrollment of 1746 pupils (869 men; 877 women); the royal institute of Messines for blind women reported 185 students. The children in orphanages, reform schools, and asylums increased the number of pupils under primary instruction by 5883 (3986 boys and 1897 girls).

The expenditure for the department of primary education in 1906 was 50,462,708 francs ($10,092,547). Of this amount, 30,030,311 francs ($6,006,062) went for the current expenditures of the public primary schools, communal and adopted, and 7,694,680 francs ($1,538,936) for school buildings, or a total expenditure for ordinary primary schools of 37,724,991 francs, equivalent to $7,544,998.

Private subsidized primary schools received an additional sum of 2,385,119 francs ($477,024), which raises the total for primary schools to 40,110,110 francs ($8,022,022).

The expenditure for primary normal schools was 2,987,370 francs, equivalent to $597,474; expenditure for infant schools, 4,000,983 francs ($800,196); for adult schools and classes, 2,049,906 francs ($409,980), for prizes, scholarships, etc., 547,442 francs ($109,488); and for direction and inspection, 766,897 francs ($153,179). The amount expended for the ordinary primary schools was 79 per cent of the entire expenditure for the department, and estimated on the enrollment was equivalent to $8.94 per capita; estimated on the population to $1.09 per capita.

The total here considered (50,462,708 francs) was met as follows: Communal appropriations, 24,360,982 francs (48.2 per cent of the total); provincial appropriations, 2,484,738 francs (4.8 per cent); state appropriation, 20,015,229 francs (41.4 per cent); fees, 1,754,731 francs (3.4 per cent). The small balance was derived from private bequests and appropriations from the *bureaux de bienfaisance* on behalf of poor children.

Characteristic Features of Primary Education. — From the high degree of local independence in school affairs, and the absence of a compulsory school law and a well-organized system of state inspection, there follow marked differences in the schools of the 2629 communes of the kingdom. The most efficient schools are found in the populous centers where Liberal ideas prevail; but, on the whole, primary education is in a low state, as indicated by the fact, brought out in the census of 1909, that a little more than 19 per cent of the population above eight years of age are illiterate. This is due in part to conditions that retard rural schools elsewhere, and in part to the narrow conception of popular education maintained by the authorities, and the prevalence of oral and dogmatic methods of instruction in parochial schools.

The theory of popular education, however, has been admirably worked out by Belgian educators, and the schools offer many suggestions as to aims and methods which are of general interest. In certain rural schools of Belgium the official program of elementary agriculture is well carried out, the theoretical instruction being completed at every stage by work in the garden and fields. In this subject the concentric method of instruction is employed with great success. An important service is rendered also by the practical methods of moral training generally employed. The teaching of thrift is illustrated by the school savings banks, which, in 1905, numbered 8117, with 431,897 depositors and savings amounting to 11,533,332 francs ($2,306,666). The system extends also to the adult schools, which were represented the same year by 27,719 depositors and savings amounting to one and a quarter million francs. School temperance societies formed in 2597 schools enrolled 103,939 members.

Brussels as a Type. — The communal schools of Brussels have been brought to a high degree of efficiency through the progressive spirit of the municipal authorities and the direct influence of the Brussels Normal School, which was founded in 1874, and under Director Sluys has become one of the chief centers of educational reform in Europe.

The public school provision of Brussels consists of 14 communal school gardens, or infant schools, conducted on Froebelian principles, in which were enrolled in 1907–1908, 2823 pupils from 2 to 6 years of age; 21 communal primary schools with an enrollment of 13,679 pupils, one royal *athénée* with 486 students; 2 communal secondary schools for boys with 1028 pupils, and one school of the same order for girls, with 849 pupils. Omitting the school gardens, the enrollment in the public schools of Brussels for the year named was 16,042 pupils, which is about 8 per cent of the city population (196,882).

In the regular primary schools an average attendance was maintained equal to 86.6 per cent of the enrollment. A force of 546 teachers was employed, comprising 22 head teachers and 66 special teachers of music, gymnastics, languages, household arts, etc. The remaining number, 438, was equivalent to one teacher for every 27 pupils in the average enrollment (11,845). This city offers very interesting examples of the adaptation of public schools to the needs of particular classes of children. Among these are: the special classes for backward children, courses in articulation for children having defects of the vocal organs, and the establishment of extra classes termed primary classes of the fourth degree, that is, a stage beyond the three sections into which the primary schools are generally divided. These advanced classes are conducted on the individual principle, with the purpose of inciting the pupils to independent, self-directed effort in the subjects upon which they are engaged, and which have immediate relation to the demands of commercial and industrial vocations. The experiment was begun in 1907 in three schools, the classes enrolling that year 261 boys. The number of classes has since been increased and the system of instruction more fully organized. Instruction in foreign languages, following the methods employed with great success in the secondary schools, is a feature of these advanced classes.

Opportunities for the continued instruction of young people above the school age are afforded (1) by the continuation classes, which in 1908 were attended by 2200 pupils (1265 young men; 935 young women); (2) by art and trades schools, which are maintained by the combined action of the state, the municipality, and private individuals or societies.

The service of medical inspection of schools is thoroughly organized, and the city affords, also, notable examples of various forms of social service through the instrumentality of the schools.

Clothing and food are supplied to the children of the ordinary primary schools by private societies assisted by municipal funds. For the daily distribution of soup and bread, maintained by *l'Œuvre de la Bouchée de Pain,* and *l'Œuvre de la Soupe,* the municipality contributes about 10,000 francs ($2000) a year. An additional 5000 francs ($1000) was allowed in 1908 for the same purpose, in the private schools. This beneficent care is extended to the homes of the poorest children through the agency of a society, *l'Œuvre de la Feuille d'Étain,* which distributes coal to the most necessitous families whose children attend the schools.

Summer colonies for school children are also organized by the combined action of the municipality and private societies. In the summer of 1908 the number of children sent for a time to one or other of these country resorts was 1729, who made a total of 20,698 days of sojourn. About one hundred and eighty crêches, conducted by private societies, for infants whose mothers are at work, are subsidized by the city and placed under its medical inspection.

Liberty of instruction in Belgium has been favorable to individual initiative and local activity in the matter, and the absence of official restraints has conduced to freedom of discussion and to the vigorous action of educational societies. The *Fédération générale des instituteurs belges* maintains a vigorous crusade in behalf of progressive methods and high standards in elementary education. In 1907 the association organized a committee of defense to protect the body of public school teachers in their rights, to expose covert attacks directed against them, and to support the principles of a public secular school system. The *Journal des Instituteurs* is the organ of the Federation, which maintains also an International Bureau of teachers' federations at Brussels. The educational policies of the Clerical party, as unfolded at the celebration of the twenty-fifth anniversary of their accession to power, which took place at Malines in 1909, have given new impetus to the activities of the Teachers' Federation and new vigor to the educational efforts of the Liberal party.

Opposition to the reactionary policy in school matters is vigorously maintained by the *Ligue de l'enseignement,* which was founded in 1864 to promote liberal and progressive policies in popular education. In 1904 the *Ligue* ceased active operations, but was reorganized and revived in 1907 under the presidency of M. Charles Buls, one of the most ardent champions of free and liberal education for the people.

The scientific study of children is carried on by the *Algemein paedogogisch Gezelschaff,* founded at Antwerp in 1902, and at the laboratory of pedology at the Brussels Normal School. The *Société belge de Pédotechnic* is composed of doctors and educators interested in the application of the results of scientific researches in the school processes.

The interest of the government in this class of investigations is indicated by the foundation of the *Institut national belge de pédologie* under official patronage.

Secondary Education. — Secondary education (*enseignement moyen*), maintained at public expense, is based upon an act of June 1, 1850, modified by acts of June 15, 1881, June 15, 1883, and February 6, 1887. These acts determine the organization and scope of the two classes of schools included in the department. Local boards consisting of the mayor and aldermen of the city or town in which the respective schools are situated, with additional members appointed by the central authority, have direct charge of the schools. The buildings and equipments for the state schools are provided by the local authorities; the current expenditures, including salaries, material, etc., are borne by state appropriations and tuition fees; the latter are low and form a very small part of the income.

The Royal Athénées. — The higher order of secondary schools include the *athénées,* the modern representatives of the colleges that formed around the ancient universities, and a few establishments which retain the old name of college. The *athénées* are day schools and for boys only. The teaching staff consists of a prefect of studies (head-master), professors, and assistants (*surveillants*). The prefect and professors are appointed by the King, and must be university men who have secured the doctor's degree; the assistants, who must have a university diploma, are appointed by the minister. The salaries are as follows:

Positions	Salaries			
	Minimum		Maximum	
Athénées	*Frs.*	*$*	*Frs.*	*$*
Inspector of studies (*préfet des études*)	4200	840	4600	920
Professor of third class	2600	520	2900	580
Professor of second class	3200	640	3400	680
Professor of first class	3700	740	4100	820
Master (*surveillant*) of second class	2200	440	2400	480
Master (*surveillant*) of first class	2600	520	2800	560

The salary of the professor of religion, which does not vary, is fixed at 2500 francs, equivalent to $500.

In Belgium, as in other countries, the question of classical *versus* scientific training has been earnestly discussed ever since the organization of secondary instruction (law of 1850).

The movement, however, in favor of science and modern languages has had less opposition than in adjoining countries. The demand for a course of modern subjects of recognized equivalence with the established classical course has been met by organizing parallel courses in the *athénées* after the French precedent, instead of by separate establishments as in Germany. After repeated experiments the present organization of the *athénées* was ordered by royal decree of August 5, 1888. In accordance with this decree, the course of study is arranged in three parallel sections as follows: Latin and Greek humanities; Latin humanities; Modern humanities. Each section comprises seven classes or years of study. The subjects and the relative weight given to each in the Latin and Greek section, are shown by the following scheme for the *athénées* of the Walloon districts:

[Figures in parentheses indicate number of hours for optional studies.]

STUDIES	CLASSES							TOTAL
	Seventh	Sixth	Fifth	Fourth	Third	Second	First	
Religion . . .	2	2	2	2	2	2	2	14
Latin	6	7	8	8	8	8	8	53
Greek	—	—	5	5	5	5	5	25
French	7	6	3	3	3	3	3	28
Flemish or German (obligatory) . . .	—	5	3	3	3	3	3	20
German or Flemish (optional) .	—	—	—	(2)	(2)	(2)	(8)	(8)
English . . .	—	—	—	(2)	(2)	(2)	(2)	(8)
History . . .	2	2	2	2	2	2	2	14
Geography . .	1	1	1	1	1	1	1	7
Mathematics .	3	3	3	3	3	3	3	21
Natural sciences	—	—	—	2	2	2	2	8
Drawing . . .	2	2	2	(2)	(2)	(2)	(2)	6 + (8)
Music (optional)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(7)
Gymnastics (two hours during recreation) . .	—	—	—	—	—	—	—	—
Total hours of obligatory lessons . .	23	28	29	29	29	29	29	—

In the section of Latin humanities the time given to Greek in the above scheme is divided between mathematics and natural sciences.

The course in modern humanities is also the same, with the exception of Latin and Greek and the addition of commercial sciences. This section consists of a lower division, comprising four years, and of two higher divisions, the scientific and the commercial and industrial, each covering three years. The section of modern humanities is correlated to the course of the lower secondary schools, which form in fact a preparatory stage to the former, leading up from the primary school. It is also permitted to introduce Latin into the lower secondaries, and where this is done they prepare for the Latin section of the *athénées*.

Students who complete any one of the *athénée* courses of instruction and pass the final examination receive a diploma (*diplôme de sortie*) which admits them to the universities. This is the goal for which the majority of the students are aiming. The diplomas of the different sections have not, however, the same scholastic values. Graduates from the classical section are admitted to any one of the university faculties; graduates from the Latin scientific section to the higher schools of engineering, mining, arts, and manufactures; graduates from the industrial and commercial section to the commercial and consular sections of the universities of Ghent and Liège.

In 1847 the government created special pedagogical courses to prepare professors for the *athénées*, *i.e.* courses of humanities at Liège, and of science at Ghent. In 1852 these courses were organized as special normal schools, and so continued until 1890, when they were merged into the universities — the former into the faculty of philosophy and letters, University of Liège; the latter into the faculty of science, University of Ghent.

The state secondary schools of the lower order (*écoles moyennes*) form a characteristic feature of public education in Belgium. They were created by the government to meet the needs of the higher artisan and commercial classes, and consequently in their programs emphasis is placed upon studies of immediate utility. They include schools for boys, dating from the law of June 1, 1880, which authorized the government to organize fifty secondary schools for boys, and schools for girls authorized to the number of fifty, by the law of June 15, 1881. This law also increased the number of the corresponding schools for boys to one hundred. Every effort is made by the government to maintain the schools of this class at a high standard of efficiency. The directors and professors are chosen upon the results of special examination, and so far as possible the service is placed on an equal footing with that of the *athénées*.

The salaries in the secondary schools consist of a fixed amount and occasional extra allowance for special merit. The fixed salaries in the schools for boys and for the corresponding positions in the schools for girls are as follows (Art. 8, law of August 4, 1881):

POSITIONS	SALARIES			
	Minimum		Maximum	
	Frs.	$	*Frs.*	$
Director	2800	560	3300	660
Master (*regent*) of second class .	2000	400	2200	440
Master (*regent*) of first class . .	2300	460	2500	500
Teacher (*instituteur*) of second class	1600	320	1800	360
Teacher (*instituteur*) of first class	2000	400	2200	440

The professors of religion receive the fixed salary of 1300 francs ($260). The professors of drawing, music, and gymnastics in the secondary schools for girls have a minimum salary of 900 francs ($180), and a maximum of 1100 francs ($220). Like the professors of the *athénées*, those of the lower secondary schools are borne on the civil pension list.

The tuition fees are low, ranging from 18 francs ($3.60) to 72 francs ($14.50) per annum. They are remitted in special cases, and there are state *bourses* (scholarships), open to competitive examination, which enable poor but promising pupils to meet their expenses. The schools are for day students only, but the authorities of the towns in which the schools are located may arrange with private persons to board students from a distance.

The course of the secondary schools covers three years, so that pupils entering at the normal age of 12 years are ready for the final examination at 15 years of age. The diploma of this order of secondary education has value in business life, and also admits the student to the modern section of the *athénées*. The subjects of instruction and the time assigned to each in the schools for boys and for girls, respectively, are as follows:

PROGRAM OF THE THREE YEARS' GENERAL COURSE

SUBJECTS	Schools for Boys	Schools for Girls
	Hours a Week	*Hours a Week*
Religion	2	2
Mother tongue	6	5
Flemish (obligatory in Flemish districts)	5	4
Flemish or German (obligatory in Walloon districts)		
First optional language, Flemish (Flemish districts); Flemish or German (Walloon districts); second optional language, English	(*a* 3)	(*a* 3)
History	2	2
Geography	1	1
Natural sciences and hygiene	*b* 2	*b* 2
Bookkeeping and writing	*c* 1	*c* 1
Mathematics	*d* 4	3
Domestic economy	——	*e* 1
Needlework	——	3
Drawing	3	2
Music	1	1
Gymnastics	2½	2½
Total number of hours for obligatory lessons	*f* 29½	*f* 29½

a Optional. *b* Not including field and laboratory exercises. *c* Two hours the second year. *d* Five hours the third year. *e* Two hours the third year. *f* 30½ hours the second and third years.

The most important modification introduced into the lower order of secondary schools since their establishment was effected by a regulation of September 10, 1897, which authorizes the schools to specialize after the first year of the course by the provision of parallel sections, commercial, industrial, or agricultural, as suits the local demands. Where the specialized programs are adopted the number of hours a week for recitation is increased to 31 or 32, and modifications of the prescribed programs are made according to the requirements. So far, as is shown by the statistics, only a limited number of the schools have availed themselves of the privilege.

In the theory of public education as it has developed in Belgium great stress is placed upon training in habits that make for the general good of society. Thrift, temperance, mutual assistance, civic obligations, kindness to animals are taught in practical ways in the primary schools; in the secondary schools these methods are reënforced by systematic lessons following excellent official programs. The immediate results of this instruction are seen in the numerous societies of pupils formed to promote the social and moral ends to which the instruction is directed. Such are the clubs of "Little Protectors" for the preservation of birds and animals; societies for the protection of trees and plants; temperance societies, etc.

Secondary Schools under Local Authorities. — The law of 1850 authorized the establishment of secondary schools by local authorities, a provision confirmed by subsequent laws relative to the service; if subsidized by the general government these schools must conform to the official regulations as to program, textbooks, and the qualifications of professors. Under present conditions the greater numbers of these local institutions are controlled by the Church or by religious orders.

Secondary Normal Schools. — For the training of professors for the lower secondary schools for boys, the State maintains two normal schools, one at Ghent, the other at Nivelles; and for the schools for girls, two similar institutions, situated respectively at Brussels and Liège.

Statistics of Secondary Schools. — The number of secondary schools and the enrollment in each class in 1908 was as follows:

HIGHER SECONDARY SCHOOLS

SCHOOLS		STUDENTS			
Class	Number	Total	Number in each Section		
			Latin and Greek	*Latin Humanities*	*Modern Humanities*
Higher secondary schools: —					
Athénées	20	5890	1441	490	3959
Communal colleges	7	727	245	40	442
Private colleges	8	1156	1034		122
Total	35	7773	2720	530	4523
Percent of total			35	7	58

The number of other schools which are doing work of a secondary character, and the student enrollment in each, is given in the following table:

INFERIOR ORDER OF SECONDARY SCHOOLS

Schools		Students				
Class	Number	Total	Number in Each Section			
Schools for boys			*Preparatory*	*Middle*	*Commercial*	*Industrial*
State .	78	15,037	9,306	5,499	213	19
Communal	5	2,460	1,202	1,258		
Private .	5	660	375	285		
Total .	88	18,157	10,883	7,042	213	19
Percent of total			60	38.6	1.1	.3
Schools for girls						
State .	34	6,256	4,023	1,926	174	97
Communal	6	1,983	990	891	85	17
Total .	40	8,239	5,013	2,853	259	114
Percent of total			60.8	34.6	3.1	1.5

The public appropriations for secondary education in 1907 were as follows:—

Athénées and Royal College	Francs	United States Equivalent
From the State . . .	1,852,544	$370,509
From the communes .	735,349	147,069
State secondary schools.		
From the State . . .	2,212,948	442,589
From the communes .	826,225	165,245
Communal schools.		
From the State . . .	2,199,128	439,826
From the provinces .	59,028	11,806
From the communes .	608,630	121,726
Total	8,493,852	$1,698,770

The secondary schools reach a much smaller proportion of the people than the primary schools; but their importance as formative centers of national life brings them also within the circle of political disturbances. Recently they have been affected by the racial antagonism between the Flemish and the Walloons. Flemish leaders have sought to eliminate the French language from schools of the northern provinces and thus oblige the *bourgeois* as well as the peasants to return to the use of the Flemish. Even in Antwerp, only one hour a week has been allowed for French, and all other instruction has been given in Flemish, notwithstanding the fact that French is the language of all cultivated people in Belgium. As a consequence, the *League for Freedom of Language* has been founded in Antwerp to combat these revolutionary tendencies.

Considered in its broad aspect, the scheme of secondary education in Belgium illustrates in a striking manner conditions peculiar to the nation. There is no marked social distinction between the secondary and the primary system, as in many European countries; for students of ability the road is open from the primary school to the university. At the same time, there is a very distinct recognition of different orders of ability and of their respective relations to different activities in national life. In the *athénées* provision is made for the training of the intellectual leaders of the nation; nevertheless, under the pressure of the highly developed industrial system, utilitarian studies have been raised to equal dignity without the sacrifice of the higher scholastic ideals.

Higher Education. — *The Universities and their Origin.* — The establishments for higher education in Belgium are the two state universities, Ghent in the Flemish section, and Liège in the French; the Independent University of Brussels, and the Catholic University of Louvain. The last named is the oldest seat of learning in Belgium, having been founded in 1426 by Jean IV, Duke of Brabant, with the sanction of Pope Martin V. It was famous in the fifteenth and sixteenth centuries for the teachings of Erasmus, Justus-Lipsius, Gerard Mercator, Ortelius, Vesale, etc. Like the ancient universities of France, it was suppressed during the revolutionary period (October 25, 1797). It was temporarily reorganized in 1816, and finally in 1835.

The University of Brussels was definitely established in 1834. For details see the article Brussels, University of. In 1816, the year following the union with the Netherlands, universities were founded at Ghent and Liège.

The government organized in 1830 recognized, provisionally, the three universities existing at the time, *i.e.* Ghent, Liège, and Louvain. By a law of September 27, 1835, the two former were constituted state universities. The same law instituted examining juries, to be appointed by the King and the two chambers, for conferring academic degrees. From that time until 1876 the degree conferring function remained detached from the universities.

Constitution of State Universities. — As constituted by the law of 1835 and amending law of March 22, 1849, each of the state universities comprises four faculties, *i.e.* of philosophy and letters, of science (mathematics, physics, and natural sciences), of law, and of medicine. In pursuance of the provision that the faculty of sciences at Ghent should offer the instruction necessary for the arts and manufactures, civil architecture, construction of roads and bridges; and the same faculty at Liège the instruction required for the arts and manufactures and mining industries, a school of civil engineers was attached to the former and a mining school to the latter. (Regulation of September 27, 1836.)

Subsequent laws, especially the law of May 20, 1876, and that of April 10, 1890, have increased the authority of the universities by according them a representation in the examining juries, but their constitution and scholastic functions remain substantially as determined by the law of 1849.

Professors. — The teaching corps comprises professors, ordinary and extraordinary, appointed by the King. They must have a doctor's degree and must devote themselves exclusively to their university duties. These duties, as also the privileges which professors enjoy, and the penalties to which they are subject, are prescribed by the law or by royal decrees. The annual salaries are 7000 francs ($1400) for extraordinary professors and 5000 francs ($1000) for ordinary, with a possible augmentation of from 1000 to 3000 francs ($200 to $600). Professors are retired as *emeriti* with an annual pension equal to the average salary of the last five years of service, when they reach their seventieth year, or if disabled by serious and permanent infirmity.

Special professors, called *agrégés*, are assigned to each university in such numbers and for such courses as circumstances may demand. The conditions of the service have been the subject of many decrees. At present, aspirants must have a doctor's degree and also a special diploma indicating high attainments in some distinct department of knowledge.

The courses which the *agrégés* give are additional to the regular courses; they have no salaries, but may receive fees, and may be engaged in other pursuits, as law, medicine, etc. The *agrégés*, naturally, become candidates for vacant chairs, so that the service is in a sense a preparation for full professorships. There are also assistants for laboratory exercises and clinics.

Officers of Administration. — The official authorities of each university are the rector, the secretary, the deans of faculties, the academic council, and the *collège d'assesseurs.* The rector is appointed by the King for a term of three years. He is the executive head of the university and has general charge of all its affairs. He may at his will convoke the *collège d'assesseurs* for advice. This body consists of the secretary of the academic council and the deans of faculties. The latter, as also the secretaries, are chosen by the professors themselves and are thus their direct representatives. The academic council consists of all the professors of a university who, in their collective capacity, determine the conduct of the scholastic affairs, as the management of courses, time-tables, etc. Through these advisory functions the professors have really a voice in the administration of the universities. Their chief importance in this respect, however, lies in the fact that they are represented in the *conseil de perfectionnement* of superior instruction, which the minister must convoke at least once a month. The constitution of this council is as follows: eight professors (representing the faculties and special schools of the universities), the two rectors, the two government inspectors (*administrateurs-inspecteurs*), and other members of the teaching profession chosen by the minister. This council gives advice upon all matters pertaining to superior instruction. It should be added that, while the rectors have general charge of students, the professors exercise disciplinary authority over those of their respective classes, and may even suspend a disorderly student.

Fees for Students. — Students are received and enrolled by the rector, the fee for enrollment being 15 francs ($3). After this formality is completed, the student takes out a ticket for the studies of the courses he proposes to follow. The fee for the ticket is 250 francs ($50) in philosophy, literature, and law, and 200 francs ($40) in the other faculties. There are also fees for the use of laboratories, for clinics, etc., and extra fees for special lessons or courses.

Lessons and Courses. — Instruction is given in the French language, except by special dispensation from the minister. A lesson occupies at least an hour. Courses must be so arranged that the student has not less than three hours of lessons each day, besides clinics and laboratory exercises. The minimum duration of the various courses is determined by the requirements for degrees, which will be considered hereafter. Attendance upon the lessons is obligatory, and every three months the professors report to the rector students who fail in this obligation.

Scholarships and Prizes. — Students of ability who cannot afford the expenses of university education may be assisted by scholarships (*bourses*), of which the State maintains one hundred and twenty, of the annual value of $80 each. Study in foreign countries is promoted by traveling scholarships, 21 in number, of the annual value of $400 each and available for two years. Competitive examination for the latter is open only to persons who have received the degree of doctor, of pharmacist, or of engineer. Annual competitive examinations (*concours universitaire*) are held, at which the successful contestants receive medals, accompanied with prizes of books or money amounting to $80 each.

Recent University Developments. — The most impressive fact in the recent history of the Belgian universities is the increase in their equipment for scientific instruction and research. The growth in these respects is illustrated by the numerous institutes that have developed as adjuncts to the faculties. Although originally the task of furnishing suitable buildings for the state universities was left to the cities in which they were located, since the passage of the law of 1875, which expressly provided for the extension of the scientific work of the universities, the central government has made large appropriations for new buildings and equipments. Among important recent structures are the Institute of Sciences for the University of Ghent, completed in 1889, and the Institute of Chemistry, University of Liège. For its magnificent electrotechnical institute Liège is indebted to the munificence of a citizen, Mr. Montefiore, whose name it bears. The Institute of Hygiene, Bacteriology, and Medical Jurisprudence of the University of Ghent is a model of structural adaptations to definite purposes.

In these modern developments the State is really following the lead of the independent universities. The Catholic University of Louvain was the first to open a school of political and social sciences, which is only one of a group of special schools, institutes, and laboratories, well-equipped for research in the physical and economic sciences.

University Diplomas. — As defined in a regulation of October 12, 1838, the university diplomas are of two orders — an honorary diploma delivered to persons (native or foreign) possessed of a doctor's degree, and who shall have given proof of superior ability, and a scientific diploma conferred upon examination. In 1853 a special scientific diploma carrying the degree of doctor was created, in the interest of persons who, after having obtained the legal diploma of doctor, should apply themselves successfully to some scientific specialty.

Until a recent date the universities were not authorized to confer degrees and had no representation in the examining boards. By an act of February 27, 1890, this limitation was removed. Henceforth the degree-conferring authorities are the four universities and a central jury in which the state universities and the free universities have equal representation. The degrees specified in the law are of two orders, called, respectively, candidate and doctor.

The degree of candidate in philosophy and letters, corresponding very nearly to the bachelor's degree in this country, is a prerequisite for the degree of candidate in law; and the degree of candidate in natural sciences, for that of candidate in medicine, surgery, and midwifery. Moreover, no one can be admitted to the examinations for the lower degree in philosophy and letters or in natural sciences unless he produces the certificate of intermediate studies, showing that he has pursued, in the one case, a course of classical study for at least six years; in the other case, the modern secondary course for at least five years. In the absence of such certificates the aspirant must submit to a preliminary examination. In general, the degree of candidate is a prerequisite for that of doctor of the same order.

The degrees conferred by the universities and the examining board have, however, no legal value until they have been registered by a special commission meeting in Brussels.

The requirements for the regular degrees as regards years of study and examinations are as follows: —

DESIGNATION	MINIMUM NUMBER OF YEARS OF STUDY	NUMBER OF EXAMINATIONS	DEGREES, NUMBER CONFERRED IN 1907
Candidate in philosophy and letters	2	2	238
Doctor of philosophy and letters	2	1 or 2	22
Candidate in law . . .	1	1	180
Doctor of law	2	2 or 3	139
Candidate notary . .	3	3	57
Candidate in physical sciences and mathematics	2	1 or 2	13
Doctor of physical sciences and mathematics	2	1 or 2	7
Candidate in natural sciences	*a* 1 or 2	1 or 2	187
Doctor of natural sciences	2	1 or 2	6
Candidate in medicine, surgery, and midwifery	2	2	158
Doctor of medicine, surgery, and midwifery .	3	3	130
Pharmacist	2	3	47
Candidate engineer . .	2	2	
Civil engineer of mines .	3	3	88
Civil engineer	3	3	94
Additional technical diplomas			195

a For candidates who propose a subsequent course in medicine, one year of study required. Aspirants for the degree of doctor of natural sciences or degree of pharmacist must take two years' study.

The fees for each examination vary from 50 francs to 100 francs ($10 to $20).

The number of students in the universities, and their distribution among the faculties and special schools in 1907–1908, was as follows: —

UNIVERSITIES	FACULTIES				TOTAL OF FACULTIES	FACULTY OF THEOLOGY	SPECIAL SCHOOLS	TOTAL FACULTIES AND SPECIAL SCHOOLS
	PHILOSOPHY AND LETTERS	LAW	SCIENCES	MEDICINE				
Ghent .	71	147	91	110	419	—	631	1050
Liège . .	176	299	856	204	1535	—	957	2492
Brussels .	128	188	224	297	837	—	353	1190
Louvain .	310	482	285	471	1548	125	565	2238
Total	685	1116	1456	1082	4339	125	2506	6970

The total number of university students was equivalent to 95 for every 100,000 inhabitants.

The appropriations from the state treasury for higher education for the triennial period covered by the last official report were as follows: —

YEAR	AMOUNT	
	Francs	United States Equivalent
1904	3,342,790	$668,558
1905	3,221,337	644,267
1906	3,192,483	638,497
Total	9,756,610	$1,951,322

For the same period, the provincial and communal appropriations were as follows: —

University	**Amount of Appropriations**			
	Provincial	Communal	Total	United States Equivalent
	Frs.	*Frs.*	*Frs.*	$
Ghent		57,340	57,340	11,468
Liège	26,600	36,367	62,967	12,593
Brussels	100,000	399,842	499,842	99,968
Louvain		47,197	47,197	9,439
Total	126,600	540,746	667,346	133,468

The University of Brussels also received subsidies from neighboring communes as follows: 1904, 9525 francs; 1905, 9325 francs; 1906, 9125 francs, or a total for the three years of 27,975 francs ($5595).

Provision for Industrial, Technical, and Commercial Education. — Belgium has made large provision for industrial, technical, and commercial education by the combined action of the State, municipalities, and private bodies such as trade unions, syndicates, manufacturers, etc. The action of the government is generally limited to granting subsidies to the schools, and maintaining the service of supervision and expert direction, leaving to the promoters of the enterprises all the details with respect to programs, conditions of admission, etc.

The schools receiving state grants must present their accounts, regulations, and reports of operations to the Minister of Industry and Labor, receive his approval for the teachers appointed, and submit to official inspection. The State on its part contributes two fifths of the total current expenditures for the schools and allows a grant equal to one half the cost of material required for the instruction.

The extent and importance of the system of industrial and technical education are indicated by the following statistics:

INDUSTRIAL, TECHNICAL, AND HOUSEWIFERY SCHOOLS, 1907–1908

Institutions		**Pupils**		
Class	Number	Boys	Girls	Total
Apprenticeship schools (*ateliers d'apprentissage*), and schools of weaving (*écoles professionnelles de tissage*) .	34	641	58	699
Technical and commercial schools and classes (*écoles et cours professionels et commerciaux*) :				
Communal	55	2048	2520	4568
Private	162	13,183	4871	18,054
Industrial schools :				
Communal	84	21,467	1002	22,469
Private	8	1499	——	1499
Schools and classes of housewifery (*écoles et classes ménagères*) :				
Communal	99	——	3329	3329
Private	167	——	6204	6204

The income of the schools included in the above table in 1907 was as follows:

	Appropriations			Private sources	Total	U.S. equivalents
	State	Provinces	Communes			
	Frs.	*Frs.*	*Frs.*	*Frs.*	*Frs.*	$
Apprenticeship schools and schools for weaving . .	30,449	8,806	14,734	19,359	73,348	14,669
Industrial, technical and commercial schools and classes :						
Communal .	646,924	397,584	661,897	189,133	1,895,538	379,107
Private . .	545,153	141,013	158,384	738,672	158,322	31,664
Housewifery schools :						
Communal .	58,456	27,552	55,875	2,526	146,560	29,312
Private . .	99,133	21,742	16,882	112,150	119,252	23,850
Total . .	1,380,115	596,697	907,772	1,061,840	2,393,020	478,602

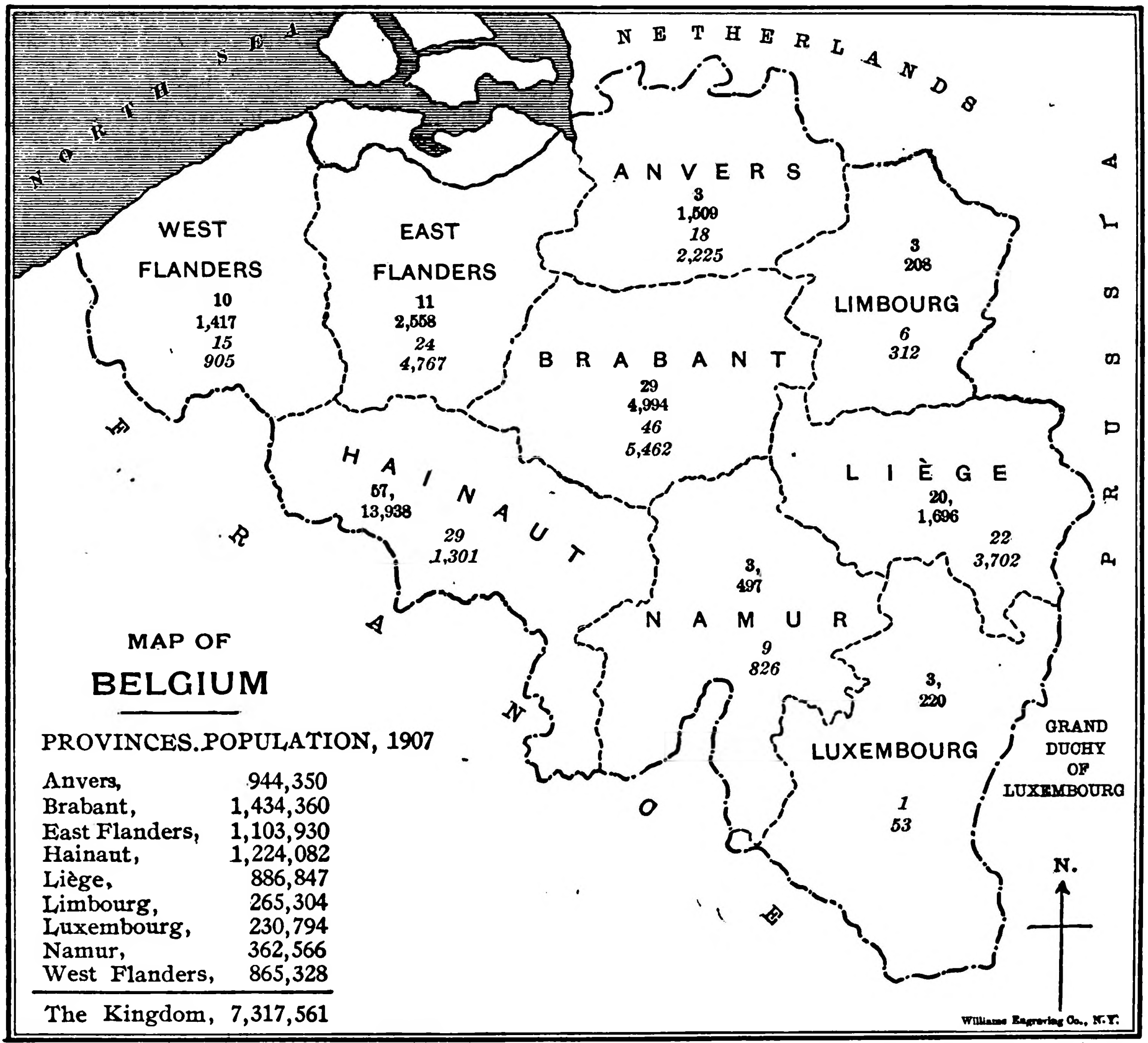
The accompanying map of Belgium shows the distribution, by provinces, of the technical, commercial, and industrial schools included in the tables.

In addition to the schools included in the foregoing tables there are higher grade commercial and technical schools in nearly all the chief places of Belgium, which derive a large part of their support from public appropriations, state, provincial, and municipal: such are the commercial institute at Antwerp, the technical school for brewers at Ghent, the provincial school of industry and of mines at Mons, Hainaut. Thirteen technical schools of this higher order reported in 1908 a total income of 908,778 francs ($181,755). Of this amount the State furnished 28 per cent, the several provinces 13 per cent, and the cities 11 per cent.

The *Institut Supérieur de Commerce* at Antwerp, founded in 1852, was one of the earliest in Europe devoted to the interests of commerce, and has always been regarded as a model in respect both to organization and equipment. It ranks with the universities, having been authorized in 1877 to confer the diploma of licentiate in commercial and consular sciences. The same year the course of study was extended from two to three years. The third year is divided into four sections, viz.: consular, colonial, maritime, and special commercial science; the section taken by the graduate is indicated on the diploma. In 1905 the government created the degree of doctor of commercial sciences, available for graduates of the third-year course, who have completed two years' practical service, after receiving the diploma of licentiate.

The general government defrays three fourths of the annual expenses of the school, while the city of Antwerp bears the remaining one fourth, and supplies the necessary buildings. In 1898 the school moved into its present imposing edifice opposite the Royal Art Gallery. It is thoroughly equipped with library, museum, laboratories, etc.

The management is in the hands of a board of directors in which the ministry of labor and industry and the city of Antwerp have equal representation. The liberal spirit of the administration is indicated by the low tuition fees, which include a matriculation fee of 25 francs (\$5) and tuition fees amounting to 200 francs (\$40) for the first year, and 250 francs (\$50) for each succeeding year, and by the assistance afforded students by means of scholarships awarded upon the results of competitive examination. A number of traveling scholarships are allowed each year for advanced students, who are thus enabled to pass the long vacation in England or Germany with a view to perfecting themselves in the foreign language.



N O R T H S E A
N E T H E R L A N D S
P R U S S I A
F R A N C E
ANVERS
3
1,509
18
2,225
WEST FLANDERS
10
1,417
15
905
EAST FLANDERS
11
2,558
24
4,767
LIMBOURG
3
208
6
312
BRABANT
29
4,994
46
5,462
HAINAUT
57,
13,938
29
1,301
LIÈGE
20,
1,696
22
3,702
NAMUR
3,
497
9
826
LUXEMBOURG
3,
220
1
53
GRAND DUCHY OF LUXEMBOURG
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Williams Engraving Co., N.Y.

MAP OF

BELGIUM

PROVINCES.POPULATION, 1907

Anvers,	944,350
Brabant,	1,434,360
East Flanders,	1,103,930
Hainaut,	1,224,082
Liège,	886,847
Limbourg,	265,304
Luxembourg,	230,794
Namur,	362,566
West Flanders,	865,328
The Kingdom,	7,317,561

Figures in Roman thus: 497, show number of Public Industrial, Professional, and Commercial Schools in the Province and enrollment in same. Figures in Italic thus: *806*, corresponding items for Private Schools.

Agricultural Education. — Provision for teaching agriculture is made both in the ordinary schools and in special schools. The latter pertain to the ministry of agriculture in which a special department of education has been created under the direction of a principal inspector, who must be a university graduate and provided with a diploma of agricultural engineer. In addition to a lecture system maintained in the interests of the farmers of the country, and numerous secondary schools of agriculture, there is a high-grade state agricultural school at Gembloux, and a state school of veterinary medicine at Cureghem.

In 1898 the state appropriation for agricultural education was 470,500 francs (\$94,100); in 1908 it was 755,500 francs (\$151,100). This was an increase of 60 per cent; but in the same time the appropriation for industrial education tripled, rising from 650,000 francs (\$130,000) to 2,150,000 francs (\$430,000). The disparity between the two is emphasized by the fact that the number of people engaged in agricultural pursuits is equal to the number in the industrial vocations.

Instruction in the Fine Arts. — The academies of fine arts subsidized by the State and the provinces exercise an influence over industrial art by the ideals which they embody and by the teachers who come under their direct instruction.

The Royal Academy of Fine Arts at Antwerp had 947 students in 1907, of whom a large proportion were artisans. The eighty-five provincial academies of art enrolled 15,886 students.

The enrollment of students in the four royal conservatories of music the same year (1907) was as follows:

	Men	Women	Totals
Antwerp	800	896	1696
Brussels	464	425	889
Ghent	517	563	1080
Liège	754	474	1228
Total . . .	2535	2358	4893

Libraries and Learned Societies. — Belgium is distinguished by the number and importance of its libraries, which as a rule are of private origin and derive their support from private sources. The government, however, contributes in various ways to their activities. The communal libraries, which owe their diffusion to the efforts of the *Ligue de l'Enseignement*, numbered 819 in 1907, distributed in 624 communes, and reported a total of 2,068,333 volumes with a yearly circulation of one and a half million.

The Royal Library at Brussels is celebrated alike for its collections and their admirable classification. The high development of library science in Belgium is illustrated by the work of the *International Office of Bibliography*, which has for its object the establishment and publication of a Universal Bibliographical Index, the supply of this index to institutions and societies requesting the same, and the study of all questions relating to bibliographical pursuits.

Among the many learned societies which offer incentives to literary activity and scientific research, the most noted are, *The Royal Academy of Science, Letters, and Fine Arts of Belgium*, which publishes important memorials by Belgian and foreign scholars and maintains prizes open to general competition; *The Flemish Royal Academy*, which concerns itself particularly with the study and culture of the language, literature, and history of the Netherlands; *The Royal Academy of Medicine*, whose objects are to consider questions submitted by the government and to maintain investigations looking to the prevention and scientific treatment of disease. The Royal Museum of Natural History at Brussels and the Zoölogical Garden of Antwerp are notable institutions.

To the administration of higher education pertains the charge of public appropriations for science and letters. These funds are used in the annual maintenance of two Belgian scholars holding the doctor's diploma at the French school at Athens; for the support of a table at the Zoölogical Station of Naples, and a second at the Laboratory of Leopoldville (Congo); for the maintenance of a certain number of triennial, quinquennial, and decennial prizes awarded for achievements in dramatic literature (French and Flemish); and for historic, scientific, and philosophical researches.

The government also maintains commissions charged with historic and scientific investigations, such as *The Belgian Royal Commission of International Interchanges* and *The Central Commission of Statistics*. The latter among other duties directs the statistical publications of the various executive departments.

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BELGRADE, UNIVERSITY OF. — See SERVIA, EDUCATION IN.

BELHAVEN COLLEGE, JACKSON, MISS. — An institution for the education of girls. English, scientific, and classical courses are offered. Music and commercial departments are also maintained. The requirements for admission are indefinite. Degrees are conferred in the classical course. Twelve instructors are on the faculty.

BELIEF. — 1. The act of affirming (*a*) the reality of an object, or (*b*) the necessary connection between ideas, or (*c*) the worth of an object or idea. 2. An idea or body of ideas whose reality or worth is thus affirmed.

To what it attaches: Belief may be experienced in connection with perceptions, illusions, hallucinations, memories, anticipations, judgments of fact (as, that water quenches fire), or with abstract relations apart from actual fact (*e.g.* postulating that parallels meet, I believe it follows that, etc.). From these instances it would appear that belief attaches either to isolated objects or to the relations between them. But it would hardly be doing violence to the truth were we to say, rather, that belief in relations is the normal and, indeed, sole form of belief. When all feeling of relation is either absent or neglected, as in the case of a sensation of yellow that is merely yellow and nothing more, we do not believe in it or disbelieve, we simply *have* it. I may believe that "gold is yellow" or that "gold is real," but I can hardly believe "gold" by itself, or "yellow," or "real" by itself. When, however, we declare that we believe in "honesty" or in "the people," belief seems to attach to an isolated object rather than to a relation. Yet even here, where we are dealing not so much with fact as with value or worth, the connection or relationship of the object may be noticed, though it is in the background.

In any event, there seems no sufficient ground for holding that belief is always equivalent to an affirmation of "reality," at least in the sense of actual existence in nature. Logical consistency with certain postulates, the question as to their exact relation to reality being left undecided, may be the basis of belief. Likewise religious, ethical, and æsthetic beliefs, while often involving questions of existence, yet in an unexpectedly large measure have reference to this other dimension of belief; namely, our sense of the value of certain ideas and ideals.

Its relation to Judgment and to other forms of connection: Belief would thus seem to be identical with judgment: whenever we believe, we judge; whenever we judge, we believe. Yet all forms of mental connection are not hereby included in belief. For relations are thought of, which we do not adopt; as when I consider whether women's voting would be advantageous to society or not, and drop the question undecided. Here the mental relation between the ideas has not as yet attained that peculiar quality we call judgment, or belief. Similarly, with a mere sequence of associated ideas in reverie, we may feel a connection among the successive ideas, but the connection is markedly different from what we experience when judging, or believing.

Its presence in other processes: Besides entering into all those intellectual processes where judgment enters, belief is also present in emotion and will. One can hardly purpose to do anything without having, mingled with his purpose, belief of several varieties and degrees. Nor can one hate or love unless the emotional state have some admixture of belief. Thus purpose and emotion tend to create belief; and, again, belief tends to enlarge itself into purpose or emotion. And consequently it is only by a scientific abstraction and artifice that belief can be separated from the total life of mind.

Causes of belief and of its variations: While for the logician belief always presupposes as its justification an antecedent judgment or system of judgments, yet this is not true psychologically. In actual life, belief often comes out of a clear sky, and without any logical antecedents. Or if there be antecedents, they may logically require a belief precisely the opposite to that which actually appears. Psychologically, the most potent forces in originating and molding belief are: 1. The beliefs of other persons. 2. The innate organization, in the individual, of instinct, impulse, and desire, which seems almost to ordain that special types of persons shall be attracted by certain ideas and doctrines and repelled by others, while opposite types show opposite affinities. The irreconcilable differences of belief shown by opposing schools of philosophy, of politics, and of religion seem often to spring from such a contrast in mental constitution. 3. Mood or emotional state, often not innate, and destined to pass away. Thus a profound depression may lead one to the belief that he is persecuted; or joy, to the belief in boundless power and wealth. The delusions of the insane frequently thus rest upon emotion, and the belief often clears as soon as the emotion becomes normal. Yet among the sane, too, belief often waits upon emotion. 4. Personal observation of fact. 5. The observations of others, communicated as testimony, — a factor closely connected with No. 1, but distinguishable. 6. Voluntary adherence to some plan or program. The deliberate practice of set forms of thought, *e.g.* certain "meditations"; joining an organization that has some special aim; publicly testifying one's adherence to a cause, perhaps by verbal expression or by wearing a badge or other symbol; the attempt to express one's faith by actual conduct, — the well-known effect of these upon belief will illustrate what is here meant.

The statement of the factors that cause or influence belief also indicates the means of training belief. Educational efforts make frequent use of the factors 1, 4, and 5 to influence belief; and in the attempt to arouse, control, or suppress certain emotions—loyalty, disgust, love, fear, and the like — in the presence of definite objects or situations, No. 3 becomes important to check or reënforce the effects of No. 2. It is also possible to strengthen belief by "expressing" it in some way (No. 5), — a method already employed in education, but capable of far greater use.

The readiness to act upon a belief has been regarded as the only sure sign that the belief is real. Yet strong emotional expression, or the endurance of excessive pain for the belief's sake, are often as convincing signs. These, therefore, may be regarded as *tests*, or *criteria*, in distinction from causes, of belief.

Disbelief is a special — a negative — form of belief; and both of these find their opposite in doubt. (See DOUBT.) G. M. S.

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BELL, ANDREW (1753–1832). — The "inventor" of the monitorial system of instruction (*q.v.*). Born at St. Andrew's, he attended the University of his native town, showing ability in mathematics and natural philosophy. After graduation he accepted a tutorship in Virginia, where he remained for seven years. On his return to England he received the degree of M.D. at St. Andrew's and took orders in the Church of England, and through patronage was sent to India. On his way to Calcutta he was prevailed upon to stay at Madras as military chaplain and superintended the Military Male Orphan Asylum. He devoted himself to the work of the school, which was badly in need of teachers. He was here driven to invent what came to be known as the "Madras system." This was nothing less than mutual instruction among the pupils. From a native school he adopted the practice of using sand tables for writing. As the teachers of his school refused to carry out this plan he appointed a few boys as head-superintendents and assistant teachers. Thus in 1791 the "system" came into existence. On his return to England he began to disseminate the plan which he had "invented." In 1798 he published *An Experiment in Education, made at the Male Asylum at Madras, suggesting a System by which a School or Family may teach itself under the Superintendence of the Master or Parent.* The system was adopted in a Protestant parochial school in London. As rector of Swanage in Dorsetshire he contributed to the establishment of thirteen schools on his plan. In 1805 he met Lancaster (*q.v.*), whom he treated patronizingly, and later conceived a violent hatred against him. In 1807 the Archbishop of Canterbury was interested in the system and it began to be introduced in many schools. In 1805 he had published *A Sketch of a National Institution for Training up the Children of the Poor in Moral and Religious Principles, and in Habits of Useful Industry.* But it was not until 1811 that the *National Society for Promoting the Education of the Poor in the Principles of the Established Church throughout England and Wales* was established. (See article on NATIONAL SOCIETY.) A central school was established in Westminster to carry out the system on a large scale. In the same year he had a press controversy with Lancaster which only strengthened the supporters of the National Society. Bell did not confine his attention to primary education alone. His system was adopted in Charterhouse and Christ's Hospital, and in 1815 he wrote *Elements of Tuition* or *Ludus Literarius*, a classical grammar. In 1816 he met Pestalozzi, without deriving any benefit from the meeting. He was too full of what he now called "the new organ." In 1818 he preached a sermon on his system at Hereford. In 1819 he was promoted to a stall in Westminster Abbey. In 1827 he published the *Manual of Instruction* for the schools using his system. He died in 1832, devoted to the last to his system. He left his wealth, which was extensive, to be distributed in grants to small schools in Scotland. In 1872 this money was converted to the establishment of Bell Chairs of the Theory, History, and Art of Education in the Edinburgh and St. Andrew's Universities. While Bell's influence on English education was great, for he was influential in reducing the teaching in elementary schools in England to an art, his personality was not calculated to attract many admirers. To the last he was blind to any defects in his system, holding that for it alone he would have waited six thousand years. Bell was more uniformly successful than Lancaster, although Lancaster probably had a much better grasp of the problem. But the work of both was marred by remarkable vanity and conceit. For the time, however, they exercised some influence on education in all parts of the world, Bell in Ireland and Canada; Lancaster on the continent and the United States. But it soon became apparent that the systems of the two men were nothing more than classroom devices and did not contain the whole truth of education. But if the actual work of the two men did not live, they were instrumental in calling into existence two societies which laid the foundations of English elementary education.

See ENGLAND, EDUCATION IN; LANCASTER, JOSEPH; MONITORIAL SYSTEM; NATIONAL SOCIETY.

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BELLEVUE COLLEGE, BELLEVUE, NEB. — Incorporated in 1880 by the Presbyterian Synod of Nebraska and opened in 1883. It constitutes part of the University of Omaha. The institution, which is coeducational, provides academic, collegiate, normal, and musical courses. Students are admitted into the college by certificate from accredited schools and by an examination requiring 14 units of high school work. Classical, scientific, and philosophical courses leading to their respective degrees are offered. The college may issue the first grade state certificate of the State of Nebraska to all graduates who fulfill the necessary requirements, which is valid for 3 years and may then be converted by the State Superintendent into a life certificate. Lower grade certificates are granted in the normal department, to which an eight-grade training school is attached. There are 12 professors and 6 instructors and assistants. Stephen W. Stookey, M.S., LL.D., is the president.

BELMONT COLLEGE, NASHVILLE, TENN. — A non-sectarian institution for the education of young women. College preparatory, collegiate, and musical departments are maintained. There is no definite statement of the requirements of admission. Diplomas and degrees are conferred. There are 18 instructors on the faculty.

BELOIT COLLEGE, BELOIT, WISCONSIN. — A non-sectarian, coeducational institution, owing its foundation to the propaganda of the Society for the Promotion of Collegiate and Theological Education in the West, organized in New York (1843), and united in 1874 with a Boston society in what later (1894) became the Congregational Educational Society. Beloit is one of the 23 colleges fostered or aided by this latter organization. The founders and most of the friends of the college have been Congregationalists and Presbyterians; but it has been warmly supported by other denominations, and has always placed a thorough education on an evangelical and unsectarian basis above any other considerations. As early as 1843 the need of a college for the region opened to settlement by the Black Hawk war in the Northwest Territory was discussed. In June, 1844, a general convention of Congregational and Presbyterian churches in the Northwest was held at Cleveland, Ohio. One evening at this convention was occupied by addresses in behalf of the Society for the Promotion of Collegiate and Theological Education in the West; as a result, returning delegates decided to call a convention at Beloit in August, 1844, to plan for the location of institutions for Wisconsin, Illinois, and Iowa. Three more conventions were held in Beloit, and that town was selected as the site of a college for Wisconsin and Illinois, largely because of its position on the border of these two states. The first Board of Trustees met October 23, 1845; a majority of its 8 ministerial members were graduates of Yale, a college whose influence appears often in the subsequent history of Beloit. The charter was approved February 2, 1846. The present Board of Trustees has 30 members, serving 3 years, divided into 3 equal classes, one of which retires each year, the successors being elected by the remaining trustees. The alumni nominate 1 member annually. The first class of 4 students began work November 4, 1847, reciting in the basement of the old Congregational Church. The college had only a classical course until 1874, when a philosophical course was added; the science course was established in 1892. Women were admitted in September, 1895, but the enrollment of women students is limited by the number which can be accommodated in the women's dormitories. The Art Department has a small but valuable and well chosen collection, opened to the public for the first time in 1908. Fraternities have been established as follows: Beta Theta Pi, Phi Kappa Psi, and Sigma Chi. The degrees given are A.B., B.S., and, for resident graduate study, M.A.; the undergraduate course of 4 years may also be completed in 3 or 3½ years. Beloit College is one of the institutions on the original list of those accepted by the Carnegie Foundation for the Advancement of Teaching (*q.v.*) as participating in its system of retiring allowances to professors. The buildings, grounds, and equipment are valued (Jan. 1, 1909) at $592,500; real estate held in Beloit, Chicago, and elsewhere, at $14,825. The total productive endowment is $1,066,667. The average salary of a professor is $1600. Of the 43 members of the instructing staff, 16 are full professors. There are 386 undergraduate and 5 graduate students. Edward Dwight Eaton, D.D., LL.D., is president.

C. G.

BEMBO, PIETRO (1470–1547). — Born in Florence, the son of a nobleman, he received his education in his native town. He later studied Greek at Messina and philosophy under Pomponazzi at Padua. In 1498 he joined his father at the court of Ferrara, where by his polished manners and graceful wit he soon became noticed. Here he met Lucrezia Borgia, to whom he dedicated a dialogue in the vernacular on Platonic love (*Gli Asolani*). After living for some time at the Court at Urbino, he went to Rome in 1512 and was appointed one of the secretaries to Pope Leo X. His colleague in office was Sadoleto (*q.v.*). In 1520 he retired to Padua, where he lived for 19 years, spent in classical study and an attempt to reproduce the life of the time of Cicero. His home became the center of the culture of that period. In 1539 he was created Cardinal and died in 1547. A typical product of the Italian Renaissance, Bembo early won a foremost position among the Latin scholars of the day. His writings are marked by attention to purity of style rather than by depth of thought. In prose an imitator of Cicero to the extent that he was pilloried by Erasmus in the *Ciceronianus*, in verse he showed equal facility in reproducing the qualities of the elegiacs of Propertius and Tibullus or the hexameters and hendeca-syllabics of Catullus. Among his poems are the elegiacs *Galatea* and *De Galeso et Maximo*, and the hexameter poem, *Benacus*. For his polished Ciceronian style he found scope in his correspondence. See CICERONIANISM.

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BENEDICT COLLEGE, COLUMBIA, S.C. — Founded as a coeducational institution for negroes by the American Baptist Home Mission Society in 1871, and chartered in 1894. Preparatory, collegiate, normal, college, divinity, and music departments are maintained. The students engage somewhat in industrial work required in the care of the campus and buildings. The admission requirements for the college course are not definite. Degrees are conferred. The faculty consists of 7 professors and 20 instructors and assistants. Rev. A. C. Osborn, D.D., LL.D., is the president.

BENEDICTINES, EDUCATIONAL ACTIVITY OF. — The order of Benedictines was established by *St. Benedict*, the Patriarch of monasticism in the West, who was born at Nursia in Umbria about the year 480. At an early age (according to some, when he was only 16 years old) he fled the corrupt life of Rome and took refuge in a remote spot on the hills of Subiaco, above the Anio, where he devoted himself to prayer and penance. He organized into a " family " those who, like himself, had left the world the better to love and serve God, and in the neighborhood of Subiaco he founded twelve such communities. In 529 he established the celebrated monastery of Monte Cassino, which thenceforth became the center from which the influence of his Rule spread throughout Europe. The *Rule* (*Regula Sancti Benedicti*), which was written about the year 530, did not contemplate the establishment of an Order, as the term is understood nowadays. It was intended merely for the communities founded by Benedict himself, each of which was to be a separate family, owing allegiance to the Pope alone.

Spread of the Benedictine Rule. During the sixth and seventh centuries the Rule of St. Benedict gradually replaced the stricter Celtic rule established by St. Columban (*q.v.*) and other Irish monks in parts of France and Switzerland. It was carried to England by St. Augustine of Canterbury (*q.v.*), who founded the first English Benedictine congregation in 597. Thence its influence was extended during the seventh and eighth centuries to Germany, through the missionary activity of St. Boniface (*q.v.*). It was introduced into Spain probably about the beginning of the ninth century. In the ninth century the Benedictine Rule had extended to all the monastic institutions of Western Europe with the exception of the British Isles, where for a century or two longer the Celtic rule was still maintained in some monasteries. By the beginning of the fourteenth century there were as many as 37,000 monasteries extending as far south as Sicily and as far north as Iceland, all following the Rule of St. Benedict or some modification of it.

The reforms of the Benedictine rule begin with the attempts of Benedict of Aniane in the ninth century to bring all the congregations under one authority. A similar attempt was made by St. Berno of Cluny in the tenth century, and is known as the Cluniac reform. The first reform which resulted in the foundation of a separate order was that of the Camaldoli in 1009. This was followed by the formation of the Cistercians (1098), Celestines (1254), etc.

The story of the influence of the Benedictines during the Middle Ages belongs to the general history of Europe, in which they played a very important part. Their educational activity is described farther on. Special mention should, however, be made of the Congregation of St. Maur, which flourished in France in the seventeenth and eighteenth centuries, and to which belonged D'Achery, Mabillon, Montfaucon, Ruinart, and Martene, whose names are associated with the beginnings of the scientific study of history and the science of paleography in modern times.

The Benedictines in the United States. — Among the first Catholic missionaries who came with the Spanish explorers were several members of the Benedictine Order. Even as early as 1493, a Benedictine companion of Columbus in his second voyage is said to have labored for a short time among the Indians. The educational work of the Benedictines in this country is, however, of much later foundation. In 1846 the Bavarian Congregation founded a mission at Beatty, Pa., out of which grew the Abbey of St. Vincent, formally established in 1855. Then in succession were founded: St. John's, Collegeville, Minn. (1856); St. Benedict's, Atchison, Kans. (1857); St. Mary's, Newark, N.J. (1857); Maryhelp, Belmont, N.C. (1885); St. Procopius, Chicago (1887); St. Leo's, Pasco Co., Fla. (1889); St. Bernard's, Cullman Co., Ala. (1891); St. Mary's Priory, Lacey, Wash. (1895). These foundations have 3 seminaries, 14 schools and colleges, and educate about 2000 students. The Swiss Congregation has also several abbeys and priories in the United States: St. Meinrad's, Ind. (founded as a mission in 1854, made an abbey in 1870); Conception, Mo. (1873); New Subiaco, Spielerville, Ark. (1878); St. Benedict's, Mt. Angel, Ore. (1882); St. Joseph's, St. Benedict, La. (1889); St. Mary's, Richardton, N.D. (1899); St. Gall's Priory, Devil's Lake, N.D. (1893). St. Meinrad's has both a seminary and a college; St. Benedict's and St. Joseph's have colleges.

St. Benedict and Education. — A cardinal principle of St. Benedict's Rule was that "Idleness is the enemy of the soul." Consequently, he prescribes that the monks should occupy themselves both "in the labor of their hands and in holy reading." Manual labor had already been adopted as a means of spiritual education by the monks of the East, and in some of the Eastern monastic Rules, notably in that of St. Basil (*q.v.*), stress had been laid on the importance of reading and study. There was, therefore, nothing novel in St. Benedict's prescription. When, however, Cassiodorus, the former minister of the Gothic kings, founded the monastery of Viviers, in Calabria, about the year 540, he gave a powerful impetus to the cultivation of learning, and by example as well as precept strove to make the monastery a veritable academy of the sacred and profane sciences. After his time, the daily routine of the Benedictine monastery included teaching, the study of Holy Writ and the classics, and the transcription of books.

The Benedictine Schools. — The educational activity of the Benedictines included in the first place reading and study on the part of the monks themselves. A knowledge of the Scriptures was recognized to be an indispensable means of personal sanctification, and for an understanding of the scriptures it was considered necessary to be acquainted with profane literature. In the second place, the monastery received within its walls two classes of boys: those who were offered by their parents (*oblati*) for the monastic life, and those who were placed there temporarily to be educated and protected, the monastery being the only place where the children of the nobility were not exposed to seizure for ransom whenever their fathers were at war with a neighboring baron or prince. This led to the distinction between the internal and external school of the monastery. Finally, among the external pupils of the cloistral schools were admitted the children of the neighboring village or countryside. For it was part of the beneficent social work of the monasteries to extend the benefits of education in letters and in the mechanical arts. These developments, however, did not take place at once. They were due to the influence of events which affected monasticism in the course of the seventh, eighth, and especially the ninth century. See articles on CLOISTER SCHOOLS; MIDDLE AGES, EDUCATION IN; MONASTIC SCHOOLS.

Curriculum of the Schools. — For the monks themselves the principal subject of study was sacred science; that is, a knowledge of the Scriptures and of the liturgy of the Church. The profane sciences, the seven liberal arts and the classics, were studied as a means to the understanding and exposition of Holy Writ. This, however, did not prevent men like Servatus Lupus, Rhabanus Maurus (*q.v.*), Gerbert, etc., from cultivating an ardent, almost a humanistic, love for the classics, while they acknowledged the principle that all profane learning should be made to subserve spiritual interests.

The children received in the monastic houses were first taught the Psalter, which they were expected to be able to recite, in Latin, before their seventh year, when they entered the monastic school. There the course of studies was uniform in all the Benedictine houses from the days of Cassiodorus down to the foundation of the Universities in the thirteenth century. It consisted of the seven liberal arts (*q.v.*), which included the *Trivium*, Grammar, Rhetoric, and Dialectic, and the *Quadrivium*, Arithmetic, Geometry, Astronomy, and Music. In regard to the former, or philological, group, Latin was, of course, the language which received most attention. During the period of Benedictine educational supremacy, Greek was practically an unknown tongue in Western Europe, except where, as at Laon, St. Gall, etc., the influence of the Irish teachers prevailed. As soon as the vernacular tongues began to develop, attention was paid to them in the monasteries, though not to the point of substituting them for Latin. Rhabanus Maurus at Fulda, Bede and Alfred in England, and the Notkers and Ekkehards at St. Gall are not exceptions, but rather distinguished examples in this respect.

The method of teaching was conditioned by the peculiar circumstances of the times. Books were scarce, hence the custom of dictating the text in the classroom. The unsettled conditions incident to the almost continuous invasions, the need of converting the nations to Christianity before trying to raise them to a plane of intellectual culture, left little time for original constructive work in literature, science, and philosophy. Meantime, it was a matter of paramount necessity to preserve the heritage of the past. Hence, the activity of teacher and pupil was almost without exception confined to commenting on the text, glossing the technical words, and, in general, "marking time without advancing" within the lines laid down by the writers of preceding generations. Vergil among the poets, Cicero among the orators, Boethius, Aristotle, and St. Augustine among the dialecticians and philosophers, were the favorite authors of the Benedictine teachers, and their works, as far as these were known, were the texts in the schools.

Famous Benedictine Schools. — Among the English schools which owed their foundation directly or indirectly to St. Augustine of Canterbury, the best known were those of Yarrow, York, Glastonbury, and Westminster. Yarrow was the scene of the literary activity of the Venerable Bede (*q.v.*), and it was at York that Alcuin (*q.v.*) acquired the educational training which he placed at the disposal of Charlemagne (*q.v.*) for the revival of learning in the Frankish Empire. To the influence of the Carolingian revival is due the foundation of the Benedictine schools at Fulda (813), Hirschau (830), and New Corbie (822), where the traditions introduced into Germany by St. Boniface were given new life and vigor. The activity of the Irish monks, who generally adopted the Rule of St. Benedict, at least after the Carolingian revival, was noticeable at Laon, St. Gall, Reichenau, Bobbio (*q.v.*), Liège and elsewhere throughout the empire. During the centuries immediately following Charlemagne's time these schools underwent various fates. Little by little they were thrown into the shade by the prestige of the schools at Paris, out of which at the beginning of the thirteenth century grew the oldest of the medieval universities, the rise of which is coincident with the beginning of the educational activity of the Mendicant Orders.

Influence of the Benedictine Schools. — Apart from their work in the schoolroom, the Benedictines exerted an influence which bore directly on the education of medieval and modern Europe. The preservation of the classics is due to their zeal and industry as transcribers of the ancient codices. Placing as they did the spiritual needs of man above every other consideration, they were not always as appreciative of the beauties of the classics as a humanist or a modern philologist might be. Nevertheless, since they were under no compulsion to preserve the literature of antiquity, we may presume that, in their efforts to preserve it, they worked in an appreciative spirit. To the Benedictines we owe almost all the famous libraries of the early Middle Ages, some of which now constitute the most cherished treasures of the British Museum, the Bodleian, the Ambrosian, the Vatican, the Bibliothèque Nationale, and the Stadt-Universitäts-Bibliothek of Munich. To their industry as chroniclers we owe almost everything that we know about medieval history, secular as well as religious. To them, too, the modern world is indebted for much in the department of the liberal and mechanical arts. The Benedictines were, it is freely admitted, the civilizers of the barbarians. Not only did they in principle maintain the nobility and sanctity of work, but they put their principle into practice, and set the example of enterprise and thrift in their agricultural labors. They drained the marshes, rendered fertile the sterile plains, built roads and bridges, introduced new methods of farming, and exerted in the social economic order an influence as great as that which they exerted in the spiritual order. In the useful and fine arts, they often led the way. It was at the monastery that the artisan and the artist could see the newest contrivance and study the newest style in architecture, painting, or metal-work. And these traditions have not entirely died out. The Benedictines are doing a large share, to-day, of the educational work in Catholic countries. They have many flourishing colleges in England and in the United States. Their efforts to found a new school of Christian art at Beuron are attracting a good deal of attention, and until quite recently the printing presses of Solesme and Ligugé were renewing the best traditions of the medieval *scriptorium* in the finest kind of bookmaking.

Literary Activity of the Benedictines. — Since the days of the Venerable Bede (*q.v.*) in England, Rhabanus Maurus (*q.v.*) in Germany, and the Notkers (*q.v.*) in Switzerland, who represent the first era of Bendictine learning, the monks of St. Benedict have maintained their reputation for high scholarship in the profane sciences as well as in theology. The Congregation of St. Maur has already been mentioned. Its members were especially distinguished in the departments of history, biblical criticism, and paleography. In the same line of work Trithemius, Abbot of Sponheim (*q.v.*), led the vanguard of scholarship in Germany in the sixteenth century. In the recent times Ziegelbauer (d. 1750), Pez (d. 1762), Gams (d. 1892), Tosti (d. 1897) and Abbot Gasquet, have attained distinction as historians; the monks of Solesmes, especially Dom Guéranger (d. 1875), Cardinal Pitra (d. 1889), and Dom Pothier, devoted special attention to Church music and sacred liturgy, and since the expulsion from France in 1901 the same congregation continues its work at Appuldurcombe in the Isle of Wight; Dom Cabrol and Dom Leclerq are among the foremost scholars of the day in the department of Christian archæology and history, while in Germany Abbot Wolter (d. 1890) has emulated in the latter half of the nineteenth century the fame which the Congregation of St. Maur attained in France two centuries ago. W. T.

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See also Article in *Catholic Encyclopedia*, Vol. II (New York, 1907), and in *Catholic University Bull.*, May, 1909, Vol. XV, pp. 441 ff. The latter contains a more complete bibliography.

BENEFACTIONS. — See PHILANTHROPY, EDUCATIONAL.

BENEFIT OF CLERGY. — The privilege known in England and America as the "Benefit of Clergy" played an indirect but a not unimportant part in the evolution of English education. It had indeed its counterparts throughout Europe under the spiritual control of the Roman Church. During very early times various privileges were claimed by and were willingly or unwillingly granted to the secular and monastic clergy. From the date of the Kentish Council of Cloveshoo in 747 to the date of the Black Death (1348–1349) education was almost exclusively under the control of the Church, and it was not unnatural that those who by virtue of their learning trained the young and ministered to all should demand and secure certain privileges. It was, indeed, an outward and visible sign of the theocratic movement that lasted in Europe from the eleventh to the thirteenth century. Our earliest record on the subject seems to prove wide privileges, for it is an enactment of King Alfred that in the case of murder by a priest he is to be unfrocked by the bishop and delivered up from the Church unless his lord will compound for the *wergeld* (*Ancient Laws and Institutes of England*, p. 34 (1840). It is, however, in the time of King Ethelstane (926) that we obtain the first English specific legal indication of a privileged position of the clergy directly related to education. The law of the King runs as follows: "If a scholar made such proficiency in learning, as that he obtained orders, and ministered to Christ, he was thought worthy of that dignity and protection that belonged thereto, unless he incurred a forfeiture of his function, and might not exercise it." The latter clause seems to refer to the exception created by King Alfred. By the time of Edward the Confessor and William the Conqueror we find that special privileges are granted to the learned. The laws of Edward and those laws as confirmed by William I (Spelmanni, *Concilia*, Vol. I, p. 619; Wilkins, *Leges Anglo-Saxonicae*, p. 197; *Chronicon Henrici Knighton*, (Rolls Ed.), Vol. I, p. 78) ordain *de clericis et possessionibus eorum:* "omnis clericus *et etiam scholaris*, et omnis eorum res et possessiones ubicunque fuerint, pacem Dei et sanctae ecclesiae habeant." It has probably not been pointed out before that the general rule of privilege was before the Conquest extended to non-clerical scholars. But in fact, to acquire scholarship was generally recognized, as late as 1350, as a step taken in view of orders, and the very numerous manorial customs by which no villein's child (before 1406) could go to school except by consent of his lord or on payment of a fine were due to the belief that the scholar was certain to become a priest or monk and would thus pass out of the jurisdiction of his lord. The *Constitutions of Clarendon* (xvi: 1164) forbade a villein's child to be ordained without the consent of the lord (see also Bracton, *De legibus Angliae*, Vol. III, p. 293). After the Conquest and the separation by William of the secular and spiritual courts it seems clear that there was a gradual approximation of the status of the priest to that of the layman. It is true that the clergy claimed "that all persons in holy orders should be exempt from secular jurisdiction in all litigation, civic and criminal." In criminal cases the exemption was largely maintained despite the struggle between King Henry II and Becket over the third chapter of the *Constitutions of Clarendon* (1164). That clause provided that a clerk should be charged before the temporal court, remitted to the ecclesiastical court for trial, and if found guilty degraded from orders and remitted to the temporal court for punishment. This doctrine was adopted by Becket's successor. The King in 1176 agreed that no clerk should be brought into a temporal court except with respect to forest offenses. But in the case of misdeameanors and civil proceedings the clergy had lost their special privilege before the year 1300. By the year 1350, despite repeated protests by the clergy, they were, says Bracton, sued every day in the temporal courts, and before the end of the century even the Pope had abandoned the claim (see Pollock and Maitland's *History of English Law*, Vol. I, p. 424 *et seq.*). The clergy also had by then lost their privilege in the case of treason. From some time about the middle of the thirteenth century the *privilegium clericale* was limited to the cases of felonies committed by the clergy; that is to say, to all capital offenses (in addition to cases of petty treason) other than those created by the law of treason and the forest law. But by this privilege the clergy were saved from the more terrible consequences of a vast range of offenses, and this was no mean privilege, no mean inducement to letters and orders in a singularly brutal age. It must, however, be remembered that learned persons not in orders soon lost this special privilege which they possessed at the date and after the date of the Conquest. In the thirteenth century, before the time of Edward I, the privilege was strictly confined to the secular and monastic clergy and nuns. The scholar who was none of these was in the power of the secular arm, since the clerical status in each case had to be proved to the justices. In the fourteenth century the practice grew up of extending the privilege "to all persons eligible for ordination, although not actually ordained; *i.e.* to all males who could read," thus restoring the practice that obtained in the eleventh century. It will be noticed how important an influence the privilege must have been from the tenth to the fifteenth century in education, that is, during the very period when stimulus to educational movements was most needed. The very fact of possessing a moderate amount of learning was for a long period sufficient to remove a man altogether from a jurisdiction that was intermittent and dilatory and to bring him within a jurisdiction that was, at any rate, merciful in the great majority of cases. Even when the privilege was restricted to felony the sudden extension of it to the laity gave it a new stimulus. It was now worth while to learn to read merely to escape mortal responsibilities for offenses that it was not always possible to avoid. We may indeed believe that until the middle of the fifteenth century the *privilegium clericale* was a valuable influence in national education. It had not yet become a formality; it was not sufficient to know by heart the "Neck-verse" (Psalm LI v. 1.) in order to save your neck. If man is to plead his privilege he must certainly be a scholar, if he is not a priest. Professor Kenny of Cambridge University gives us (*Outlines of Criminal Law*, p. 480, n. 3) an instance of modern times that really represents the attitude of the fourteenth century in the matter. He says: "By a singular coincidence even the Arabs of modern Algeria have recognized learning as a ground of criminal immunity. Abd el Kadr said: "'More than once I have remitted sentence of death on a criminal from the mere fact of his being a scholar. It requires so long a time in Algeria to become well instructed, that I had not the courage to destroy in one day the fruit of years of laborious study.'" (Churchhill's *Life of Abd el Kadr*, p. 145.) With the coming of the Renaissance (*q.v.*) the privilege became a social danger. The elements of learning were at last more widely spread and the criminal classes found shelter in a privilege intended for a holy or learned class. By a statute of 1488–1489 (4 and 5 Henry VII, c. 13) the layman could claim the privilege only once and, in order to prevent an abuse of the privilege, the layman claiming it was branded on the brawn of the left thumb with an "M" for murderer or "T" for any other felony. "Divers persons learned" were thus discouraged from the "presumptuous boldness" of committing crime "upon trust of the privilege of the Church." In 1531–1532 (23 Henry VIII, c. 1) the privilege was taken by statute from all persons not in orders or under the order of subdeacon and thus once more the learned layman was excluded from Benefit of Clergy.

The remainder of the history of the privilege is strictly limited to criminal law. The Benefit was revived presumably for the purpose of mitigating a criminal law of great severity. In 1532 (23 Henry VIII, c. 1) the privilege was removed in cases of deliberate murder. In Elizabeth's reign the spiritual courts were ousted altogether and the privilege given to all persons who could read. To claim it, however, involved one year in jail. In the reign of William III it was extended to women, literate and illiterate (we must remember that nuns and perhaps other women who could read had the privilege in the Middle Ages). In the reign of Anne illiterate men were allowed to claim the privilege but at the same time the practice grew of excluding many felonies from the Benefit. At the end of the eighteenth century there were 160 felonies without Benefit of Clergy. The privilege was abolished in England in 1827 (7 and 8 Geo. IV, c. 28) and in Ireland in 1828, nine hundred years after we first hear of it.

It must finally be noticed that the privilege to-day is not absolutely dead. It passed with the English common law to America, and American law books mention cases in which Benefit of Clergy was pleaded. It was abolished by statute in Massachusetts in 1784. In the states of Indiana and Minnesota the courts in more recent times have rejected the doctrine. But it apparently still survives in North Carolina and South Carolina. In the former state the privilege was conceded to women, the court declaring that "no reason can at this day exist, why females shall not be entitled to the Benefit of Clergy, as well as males." (See the case of the *State v. Gray*, 1 Murphey 147, J. P. Bishop's *New Criminal Law*, 7th ed., 1892, Vol. I, sec. 938, p. 564.) In the same state "it would seem that the statutory pardon, which is an incident to the Benefit of Clergy, does not take effect until the party is burned in the hand and delivered out of prison." If the record accidentally omits to set out such execution of the sentence, it may be shown by a witness. (*Keith v. Goodwin*, 6 Jones, N.C. 398.) See on the practice of North and South Carolina the cases of the *State v. Bosse* (8 Rich. 276) and the *State v. Sutcliffe* (4 Strob. 372). It may possibly exist in some other states but it has generally been abolished by statute. Dr. Kenny suggests that the survival in the Carolinas "is perhaps connected with the educational gulf between the white and the colored criminal." If so the privilege of Benefit of Clergy has an educational meaning to-day, a thousand years after its first invention.

J. E. G. de M.

BENEKE, FRIEDRICH EDUARD (1798–1854). — A German philosopher and educational theorist. He was born in Berlin and attended the Friedrich-Werder Gymnasium, which was then under the direction of the excellent pedagogue Bernhardi Graduating at the early age of fifteen, he enlisted in the German war of liberation, after which he studied theology, first at Halle, then (1817) in Berlin. There he came under the influence of Schleiermacher and, having turned his attention from theology to philosophy, began to lecture in 1820. Two years later his lectures were stopped by the order of the government; this was probably due to the influence of Hegel, whose "absolute" philosophy Beneke opposed. For three years he found a refuge in Göttingen, but at length he was allowed to resume his lectures in Berlin. In 1832, after Hegel's death, he was finally appointed assistant professor, but not until nine years later did he receive the meager salary of 200 thalers. In March, 1854, when for some time on account of severe mental strain his health had been giving way, he disappeared from home, and it was thought committed suicide.

Beneke's most important work, from a pedagogical point of view, is his *Erziehungs- und Unterrichtslehre* (*Theory of Education and Instruction*, 2 vols., Berlin, 1835–1836). His pedagogy, however, as well as his ethics, logic, and metaphysics, is founded on his psychology, which is treated in his *Lehrbuch der Psychologie als Naturwissenschaft* (*Textbook of Psychology as a Natural Science*, 1833).

Beneke's philosophy takes its starting point in internal sense perception, which he considers the source of all knowledge. According to him, the mind is a concrete psychological organism, a system of primitive immaterial forces, which are capable of development under the stimulation of the outside world. These primitive forces (*Urvermögen*) differ as to tenacity, energy, and receptivity. The psychical products caused by the action of external stimuli on the primitive forces persist in consciousness as "traces" (*Spuren*), which by their manifold combinations in groups and series constitute the mental life of the individual. The so-called faculties of the older psychology, such as memory, imagination, etc., Beneke, like Herbart, considered as mere abstractions. Memory, for instance, has no real existence as a faculty apart from concepts, but is simply the fundamental quality of tenacity inherent in the primitive forces of the soul. Thus the old idea of "formal discipline" was shown to be no longer tenable.

The genetic character of Beneke's psychology made his system especially applicable to pedagogy, and it is therefore not surprising to find that his influence on German teachers is ranked second only to that of Herbart. Thus, Diesterweg, the foremost Prussian educator of the last century, as well as Dittes, who as director of the Vienna "Paedagogium" did a great work for education in Austria, were both ardent admirers and followers of Beneke.

Beneke's works include, besides those mentioned above: *Erfahrungseelenlehre als Grundlage alles Wissens* (*Empirical Psychology as the Foundation of all Knowledge*, Berlin, 1820).

Grundlinien des natürlichen Systems der praktischen Philosophie (*Principles of the Natural System of Practical Philosophy*, 3 vols. 1837–1841), which the author considered as his most successful work.

Grundlegung zur Physik der Sitten (*Foundation towards a Physics of Morals*, 1882); *Psychologische Skizzen* (*Psychological Sketches*, 2 vols. 1833); *Grundlehren der Sittenlehre* (*Foundation of Ethics*, 1836).

System der Metaphysik und Religions-philosophie (1840); *System der Logik* (2 vols. 1842); and *Pragmatische Psychologie, oder Seelenlehre in der Anwendung auf das Leben* (*Psychology Applied to Life*, 2 vols. 1850). F. M.

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BENNETT COLLEGE, GREENSBORO, N.C. — An institution founded in 1873 under the auspices of the Freedman's Aid Society of the Methodist Episcopal Church and supported by that society and the North Carolina Annual Conference for the education of negro boys and girls. Pupils may enter from the public schools. Primary, preparatory, collegiate, normal, and music departments are maintained. The majority of the pupils are in the primary and preparatory departments. Degrees are conferred. There is a faculty of 12 instructors. Silas A. Perler, A.M., D.D., is the president.

BENT-IRON WORK. — See METAL WORK IN THE SCHOOLS.

BENTHAM, JEREMY (1748–1832). — Publicist, utilitarian philosopher, and reformer of English law and educational administration; son of a wealthy London attorney; a precocious child; educated at Westminster and Queen's College, Oxford; called to the Bar at Lincoln's Inn, 1817; devoted himself to the scientific study of jurisprudence; published in 1776 anonymously his *Fragment on Government*, an attack on the point of view of Sir William Blackstone, whose lectures he had attended at the University of Oxford. The publication of this work led to his intimacy with Lord Shelburne, which introduced him to circles of influence and raised him from a depressing feeling of impotence and humiliation. In 1789 he published his *Introduction to the Principles of Morals and Legislation*, in which he expounded the principle of utility in its bearings upon conduct and public law. He distinguished himself as a reformer of prison discipline and as an acute critic of obsolete fictions and erroneous psychological presuppositions in English law. Indirectly, through the labors of his followers, among whom should be mentioned John Mill (*q.v.*) and Francis Place (*q.v.*), he had a penetrating influence upon English politics and upon the spirit of English social legislation, including that which dealt with educational questions. Directly, he helped in achieving three educational changes of great importance in English history: (1) He led the opposition to religious tests at the older universities by a pamphlet, *Swear not at all,* printed in 1813, published 1817.

(2) In 1816 he published *Chrestomathia*, a plan for secondary education which gave physical science a prominent place and attacked the supremacy of the classical languages. By this work he turned the thoughts of many liberal educational reformers towards a one-sided and narrow conception of secondary education. (3) In 1827 he devised a detailed plan for requiring every candidate for an official position under Government to pass a competitive examination in certain branches of knowledge bearing upon their future work. This plan (many of the details of which are grotesque and disregardful of many important conditions of sound education) led ultimately to the application of the principle of open competition to the selection of candidates for the Indian and Home Civil Services under the British Government. Bentham's ideas on public instruction were to some extent derived from his study of French revolutionary writers. His influence was both destructive and constructive, and from both points of view of the highest importance. He and his followers destroyed the prestige of much of the old tradition in English education and government, and by their acute criticisms and administrative industry cleared the ground of much that was obsolete, ineffective, and obstructively incompetent. On the other hand, by challenging many of the principles which underlay the older plan of English education and government, they forced their opponents to reconsider their position and by internal reform to renew the vitality of much which Bentham would have swept away. Moreover, the inner tendency of Bentham's doctrine was towards a great strengthening of the bureaucratic power of the central administration in the service of a democratic electorate. This side of Bentham's influence was especially marked in his disciple, Edwin Chadwick.

M. E. S.

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BENTON HARBOR COLLEGE, BENTON HARBOR, MICH. — Founded in 1886, this institution provides educational facilities from the kindergarten to the college, and includes also normal, fine arts, and musical departments. Preparation is given for state certificate examination and for the universities. There are 16 instructors on the faculty.

BENTON, THOMAS HART, JR. (1816–1879). — Schoolman, educated at Huntington Academy and at Marion (Mo.) College; he was principal of a seminary at Dubuque, Iowa (1829–1848), and twice state superintendent of public instruction in Iowa (1848–1854 and 1858–1861); he was also prominently identified with the educational associations of Iowa and the professional journals of the State.

W. S. M.

BEREA COLLEGE, BEREA, KY. — A coeducational institution founded in 1855 by antislavery Kentuckians who favored freedom regardless of sectarian differences. The board of trustees includes representatives of all denominations. Model school, industrial, academic, normal, collegiate, and music departments are maintained. The academy course gives instruction in business, farming, and domestic science subjects and prepares for college. The entrance requirements to the college vary somewhat with the course to be pursued, but about 15 units are necessary to take up the classical, 8 the literary, and 12 the scientific courses. Degrees are conferred in the college and normal departments which also prepare for county and state certificates and diplomas. The institution maintains separate work, as required by state law, for colored persons. There are 13 professors and a large number of instructors and teachers. Rev. Wm. Goodell Frost, Ph.D., D.D., LL.D., is the president.

BERENGARIUS. — Born at Tours *c.* 1000, a pupil of Fulbert of Chartres, who had in turn been the pupil of Gerbert. He was a profound student of logic, and is credited with the distinction between the study of the *arts* of grammar and logic and the mere study of authors. Accordingly, he spurned the authority of Donatus (*q.v.*), Priscian (*q.v.*), and Boethius (*q.v.*). He entered into a controversy with Lanfranc, Berengarius attacking the doctrine of transubstantiation, and Lanfranc defending it. In this controversy the position of Berengarius was founded on the nominalistic doctrine. Berengarius became a canon of Tours, and preceptor of the School of St. Martin; and afterwards would appear to have been teaching at the cathedral school at Angers as *grammaticus* rather than *scholasticus*. He was several times compelled to retract his tenets only to return to them again. The greater number of his works are lost, but the *De Sacra Coena* and others may be found in Migne. Berengarius died on January 6, 1088.

P. R. C.

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BERKELEY DIVINITY SCHOOL, MIDDLETOWN, CONN. — An institution for the training of ministers for the Episcopalian Church. Chartered and located in its present position in 1854 to continue a theological department organized at Trinity College. No student is admitted unless he has become a candidate for holy orders according to the Canons and has satisfied the requirements for admission. The degree of Bachelor of Divinity is granted on the completion of the course to students who fulfill the necessary requirements. There are 6 professors and 4 instructors on the faculty. The Rt. Rev. Chauncey Bruce Brewster, D.D., is the president.

BERKELEY, GEORGE. — Born at Kilcrinin, Ireland, March 12, 1684, a man who stood alone in his day as a type of the perfect philosophical spirit of calm reasonableness, is as interesting for his sojourn in America and his efforts for the betterment of colonial education as for his system of idealistic philosophy. Educated at the Ormond School in Kilkenny, and later at Trinity College, Dublin, he became chaplain to the Lord Lieutenant of Ireland and afterwards to the Earl of Peterborough in Italy. He became Dean of Derry in 1724. Seven of the best years of his life and the greater part of his private fortune were devoted to the cherished scheme of the establishment of a college in America for the education of the Indian youth. Berkeley's proposals were published in 1725, and their novel and philanthropic character not only attracted great public interest in England but induced 3 Oxford fellows to accompany him on the necessary expedition. A charter was given him for "Erecting a college, by name St. Paul's, in Bermuda, with a president and nine fellows, to maintain and educate Indian scholars, at the rate of ten pounds a year, George Berkeley to be the first president, and his companions from Trinity College the fellows." At this time Swift wrote to the Lord Lieutenant of Ireland: "I do humbly entreat your excellency either to use such persuasions as will keep one of the first men of the kingdom for learning and genius at home, or assist him by your credit to compass his romantic design." The death of the king before the signature of the charter, and the unwillingness of Walpole to undertake the proposed expenditure of £20,000 on behalf of so apparently Utopian a venture, at length compelled the philosopher to return, his work unfulfilled. In fact he never reached Bermuda, but the vessel which carried him apparently made Newport, R.I., by mistake. Here in 1704 he established himself, his principal duty for two months being to attend on pirates about to be executed. He became connected with one of the Trustees of Yale College, to which he gave generous donations, including a splendid library of 1000 volumes, until then the best America had known. Berkeley also became interested in the development of Harvard College, and the project of the foundation of Columbia College. His "ideal theory" need not be discussed in this place; but is best outlined in his own words. "The belief in an exterior material world is false and inconsistent with itself; those things which are called sensible, material objects, are not external, but exist in the mind by the immediate act of God, according to certain rules, termed laws of nature, from which He never deviates; and the steady adherence of the Supreme Spirit to these rules is what constitutes the reality of things to his creatures; and so effectually distinguishes the ideas perceived by sense from such as are the work of the mind itself, or of dreams, and there is no more danger of confounding them together on this hypothesis than that of the existence of matter." P. R. C.

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BERKELEY, KATHARINE, LADY (*c.* 1320–1385). — As the first woman who is known to have founded a grammar school, "Katerin," Lady Berkeley, deserves remembrance. The daughter of Sir John Clyvedon, Kt., and the Lady Emma, his wife, who was first married to Sir Peter Veel, a Gloucestershire knight, who died in 1343. Four years afterwards, May 31, 1347, she married, as his second wife, Thomas III, Lord Berkeley of Berkeley Castle, Gloucestershire. "She was fruitful to her husband both in lands and children," bringing him among other manors one called Veelham, alias Ham-Veel, a happy conjunction. In less than five years she had four sons, three of whom, however, died in infancy, but the youngest, John, became the founder of a new family of Berkeleys. Lord Berkeley died Oct. 27, 1361. His widow survived him 24 years, dying March 13, 1385. She founded the Chantry and Free Grammar School of Wootton-under-Edge, where she mainly lived, on July, 1 1384, about two years after the foundation of Winchester College. Almost in William of Wykeham's words she says that "considering the intention and desire of many to be taught and to study grammar, which is the foundation of the rest of the liberal arts, is too often prevented by poverty, therefore for the exaltation of the Christian faith, which is in no small measure increased by men of deep learning in such sciences," she founded a School-house or House of Scholars of one master and two poor "scholars clerks," who are to live college-wise together, and incorporated them as a college. Statutes annexed provided that the master should act as chaplain in St. Katharine's Chapel at the manor-house when she was living there, and, otherwise, celebrate mass in the parish church for her and her two husbands' souls and the lords of Berkeley, and also "keep school faithfully in the school house, and receive kindly all scholars, wherever they come from to learn grammar, without exacting, claiming or taking any advantage or gain for his pains." The two "scholars clerks" were to be admitted at 10 years old and stay for 6 years. Liberal holidays were provided; a fortnight at Christmas, a week at Easter and Whitsuntide, and 6 weeks from August 1 to September 15. At the dissolution of chantries in 1547, the school is called the "Vele Fre Scole," after the founder's first husband, and the endowment was stated to be £17.15.2, of which the master got £10.1.7½, or 1*s*. 7½*d*. more than the headmasters of Winchester and Eton. The school escaped dissolution by the influence of Lord Berkeley, and still flourishes, the endowment bringing in £330 a year. In 1900 it was, very appropriately, made a mixed grammar and science school, for girls as well as boys, to the number of 70. A. F. L.

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BERLIN, THE ROYAL FREDERICK WILHELM UNIVERSITY OF. — The preliminary history of the University of Berlin goes back to the closing years of the eighteenth century, but no serious steps looking toward the establishment of an institution of higher learning were taken until the beginning of the following century. In 1807 a delegation was sent by the faculty of the University of Halle to Berlin and requested the royal sanction for a removal of their institution to the Prussian capital. Their petition was not granted, however, as the Prussian authorities preferred to establish a new and independent university in the capital. This latter proposal encountered decided opposition at the University of Frankfort-on-the-Oder, which feared the competition of so near a rival, as well as, in certain quarters, of the Academy of Science. The opposition was ignored by the authorities, and a series of lectures was inaugurated in the winter of 1809, this being the reason why the latter date is frequently given as the year of foundation. The university was not formally opened until the following year, Wilhelm von Humboldt (*q.v.*), at that time Prussian minister of education, being primarily responsible for its earliest development. It was named the Royal Frederick William University, in honor of its founder, King Frederick William III of Prussia, who approved the statutes of the institution in 1816. Berlin is, therefore, with the exception of the universities of Bonn (1818) and of Munich (1826), the youngest university in the German Empire. During the first year it had 58 instructors and 256 students; to-day it is the largest and most prominent institution of higher learning in Germany, comprising faculties of theology, law, medicine, and philosophy, as well as schools of agriculture, pharmacy, and dentistry. The Berlin technological school, located at Charlottenburg, is not a part of the university proper. Independent of the university, but closely associated with it, are the Royal Academy of Science, established in 1700, the Institute for Contagious Diseases, a geodetic institute, an astrophysical observatory at Potsdam, a meteorological institute with headquarters in Berlin, a meteorological-magnetic observatory in Potsdam, and an aeronautic observatory at Tegel. The library of the university is comparatively small, containing only about 200,000 volumes, the chief facilities in this direction being furnished by the Royal Library, which contains over a million volumes as well as a large and valuable collection of manuscripts. No other German university is so richly endowed with "institutes," seminars, clinics, and similar organizations, among which the seminar for Oriental languages deserves special mention. It was opened in 1887, and performs a practical mission, being intended for the training of young men in preparation for foreign service. The course of study includes instruction in Chinese, Japanese, Arabic, Persian, Turkish, various African dialects, etc. Of special interest and of practical value to foreign students is the bureau of information (*Akademische Auskunftsstelle*) under the direction of Professor Wilhelm Paszkowski. The annual expenditures amount approximately to $1,000,000. In spite of the fact that the university is located in the metropolis of the empire, there is no lack of social student organizations, a considerable number of *Corps* (*q.v.*), *Burschenschaften* (*q.v.*), *Landsmannschaften* (*q.v.*), and similar societies being represented. Both Harvard University and Columbia University support exchange professorships at the University of Berlin, that of the latter institution being known as the Theodore Roosevelt professorship of American history and institutions. Among the prominent names associated with the university are those of Wilhelm von Humboldt, Jakob and Wilhelm Grimm, Bopp, Scherer, Lachmann, Müllenhoff, Hegel, Fichte, Trendelenburg, Paulsen, Ranke, Mommsen, Treitschke, Droysen, Niebuhr, Gneist, Virchow, Ehrenberg, Helmholtz, Kirchhoff, Dubois-Reymond, and a host of others. During the winter semester of 1909–1910 the enrollment included 9242 matriculated students, distributed as follows: theology 367, law 2512, medicine 1646, and philosophy 4717; of these 632 were women. There were also in attendance on the university proper 1077 auditors, giving a total registration of 10,319. R. T.

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BERNE, THE CANTONAL UNIVERSITY OF SWITZERLAND. — Established as a university in 1834, although an institution of higher learning had been in existence in the Swiss capital for over three centuries. It was as early as 1528 that, through the influence of the Reformation, the Zwingli school in Berne was supplemented by a gymnasium, the higher grades of which constituted a sort of philosophical and theological academy. During the eighteenth century chairs were also established for law, medicine, and the natural sciences. The work of the institution naturally suffered severe interruptions during the Revolution, but in 1805 a new, albeit modest, start was made with all four faculties, resulting ultimately, in 1834, in the formal establishment of the university. During the years from 1846 to 1854 the life of the institution again hung in the balance, but it issued safely from its period of storm and stress, and has since experienced a gradual and healthy development. As at present constituted, the university includes faculties of Protestant and Catholic theology, law, medicine and veterinary medicine, and philosophy. In 1905 the library of the university was consolidated with that of the municipality, numbering at present 200,000 volumes and a number of valuable manuscripts. The Swiss national library (*Landesbibliothek*), founded in 1895 and located in Berne, contains a valuable collection of *Helvetica* from the time of the foundation of the new confederation in 1848, the earlier material being deposited in Lucerne. The expenditures of the university amount to about $175,000 annually. During the winter semester of 1909–1910 there were in attendance 1626 men and 345 women, among whom there were a considerable number of Russians; 536 auditors were enrolled. R .T.

BERYTUS, THE SCHOOL OF. — "Berytus, the foster-mother of law," was from the third century A.D., if not earlier, the seat of a celebrated school of law. Originally the training of the orator and the training of the advocate were the same. The general principles of argumentation and the power of effective pleading were at first the things most necessary for the lawyer to acquire. These were provided in the sophistic (*i.e.* oratorical) school, in which the preparation of fictitious cases based on those of actual occurrence formed an important part of the school discipline. For the rest, for the actual citation of the clauses of the law, the orator depended upon the services of one versed in the law books. Gradually the technical side of the subject came to the fore, and then schools of law arose. The first mention of Berytus as a law school dates from the fourth decade of the third century. Until well into the fourth century, however, the prospective law student often took a preliminary course in sophistry. In the second half of the fourth century this practice probably became less and less common.

When Justinian, in 529, issued his rescript closing the schools of philosophy and law at Athens, he restricted the study of jurisprudence in the East to Constantinople and Berytus. At about the same time he reorganized the course of study in the schools, and, apparently, changed the length of the course from four years to five. Before this time the instruction had been in considerable confusion. For the most part selections only from a limited number of books had been read, and these often with little regard for the proper order of the subjects studied. The instruction had been based in the main on the *Institutes* of Gaius, Hadrian's *Perpetual Edict*, the *Responsa* of Papinian, and the *Responsa* of Paulus. In the fourth year the student had attended no lectures, but had been supposed to read by himself. From the time of Justinian, the new codifications of that emperor were made the basis of study, while much more was read, and read in logical sequence. In the first year the *Institutes* and the so-called πρῶτα (Bks. I–IV) of the *Pandects* were read; in the second, third, and fourth years the *Pandects* were continued, and in the third year the *Responsa* of Papinian were also taken up; the fifth year was devoted to the *Codex*. Each of the 5 classes of students had a distinctive name: the Freshmen, called up to this time *Dupondii* ("Two-Pounders"), now received the name of *Justiniani novi* (New Justinians); second-year men were *Edictales* (students of the Edict); third-year men, *Papinianistae* (students of the works of Papinian); fourth-year men, Λύται (a name of uncertain signification); fifth-year men, *Prolytae*. The duty of seeing that the new regulations of the school were carried out was assigned to the Governor of Phœnicia, the Bishop of Berytus, and the professors of the school.

According to a regulation of Diocletian, students were not allowed to attend the law school at Berytus beyond the age of 25. The hazing of students, especially of newcomers, and the playing of practical jokes upon the professors, had been of common occurrence up to the time of Justinian, but that emperor forbade all such practices for the future. The number of professors at Berytus was probably 4, but there were, besides these, several assistants. In 554 Berytus was destroyed by an earthquake, and the law school was demolished, many students perishing in the ruins. While the city was being rebuilt, the professors lectured in the neighboring town of Sidon.

J. W. H. W.

See Universities.

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BESANÇON, UNIVERSITY OF. — This institution had a chequered history. A bull was obtained in 1450 for the erection of a *studium generale* in arts only, owing to the existence of other faculties at the neighboring University of Dole. The bull was, however, not carried out. In 1480 the King issued letters patent transferring the University of Dole to Besançon, but revoked them in 1483. The University of Dole was revived, and another attempt was made in the next century by Besançon to secure the privilege. It was not until 1691 that this met with success. In 1793 the University of Besançon was suppressed and was not reëstablished until 1896. The university includes faculties of sciences, letters, medicine, and pharmacy. In 1909 285 students were enrolled in the various faculties.

See France, Education in; Universities.

BESANT, SIR WALTER (1836–1901). — English novelist and philanthropist, born in 1836 at Portsea, England. He attended a small private school at Southsea, on leaving which he says, " I had less Latin and Greek than at twelve, but I suppose I knew more real grammar." Mathematics was the only subject well taught. From this school he went to King's College. During this time he took great pleasure in walking round London. His chief impression at this period was of the temptations which beset the lonely students. In 1855 he entered Christ's College, Cambridge, which had all the advantages of a small college in offering opportunities for forming friendships, but on the educational side was subjected to severe criticism. One of his intimate friends was the classical scholar and wit, C. S. Calverley. At Cambridge he studied mathematics, and obtained a place among the wranglers. He left the university with the intention of taking orders, and on this condition accepted an appointment to teach in Leamington College. As the period of ordination came near, he grew restless, and accepted the offer of a professorship in Mauritius, where he remained from 1861 to 1867. On his return he was appointed Secretary of the Society for the Systematic and Scientific Exploration of Palestine. He now entered on that career which has given him a place in English literature. His contribution to education and philanthropic causes are not so well known. He renewed his interest in London at this time, and particularly with the East End. Out of this grew his book, *All Sorts and Conditions of Men* (1880–1881), which led to the foundation of the People's Palace (*q.v.*), an institution, as Besant hoped, where organized recreation, orderly amusement, and intellectual and artistic culture might be offered to the poor. When a polytechnic was added and the original objects were not being carried out by the Draper's Company, who took over the institution, Besant resigned from the committee. In another book, the *Children of Gibeon*, the author drew attention to the widespread evils of sweating, and may in some measure have contributed to amelioration. He further took a strong and abiding interest in girls' and lads' clubs in the East End. At the suggestion of Charles G. Leland (Hans Breitmann) (*q.v.*), who had organized evening manual arts schools in Philadelphia, Besant formed the Home Arts Association, which attracted considerable attention and support. Under its able secretary, Miss Annie Dymes, the association soon had 500 schools at work. The organization of employment bureaus for women, ragged schools, and continuation schools received the support of Besant, who contributed articles on the last two movements to the *Contemporary Review*. In one of these articles, " From Fourteen to Seventeen," he strongly advocated the establishment of evening continuation schools, but deprecated the provision of free education in all subjects at the expense of the ratepayers. In that great educational movement which took place in England during the last 20 years of the nineteenth century Besant took his part as the stanch friend of the poor and submerged classes.

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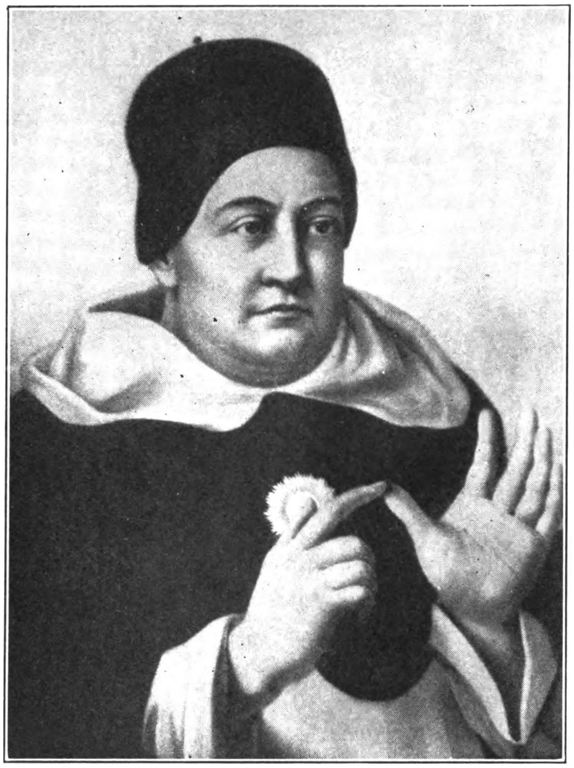
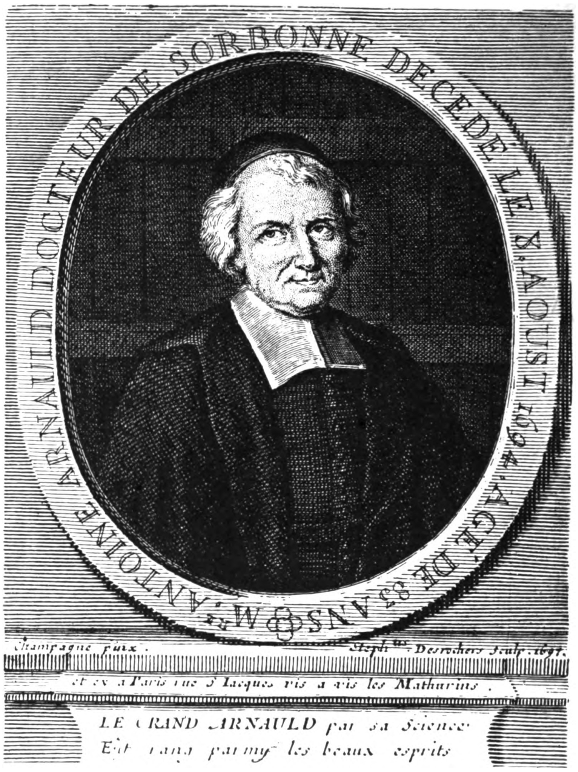
Forum, Vol. 34, p. 150.
Nineteenth Century, 27, 344.

BESSIE TIFT COLLEGE, FORSYTH, GA. — Founded in 1847 as Monroe College, an institution for girls and young women. Preparatory, college, musical, and industrial departments are maintained. About three years' high school work is required from those who enter by examination; certificates of accredited schools are accepted. Degrees in the literary and musical courses are conferred. There are 22 instructors on the faculty.

BETHANY COLLEGE, BETHANY, WEST VIRGINIA. — A coeducational institution, established in 1841 by Alexander Campbell, the founder of the sect known as the " Disciples of Christ," " Christian Church," or " Campbellites." The college claims to be the parent of the other educational institutions of this sect, including Kentucky University (*q.v.*), Lexington, Kentucky. The catalogue of 1907 urges Disciples of Christ to support Bethany College as a Disciples' College; but that of 1909 omits this statement and describes the institution as " nonsectarian but broadly Christian." Besides the usual undergraduate courses, the college maintains a preparatory school, a normal school giving the degree of Bachelor of Pedagogy, a commercial department, departments of music and art, and a Department of Ministerial Education, giving degrees of M.A., and Bachelor of Biblical Literature. The college is said to have been for a long time the only one in the United States using the Bible as a textbook. The Board of Trustees, of 33 members, is self-perpetuating; the trustees go out of office each year, the remaining trustees choosing the successors. Twenty-eight of the trustees were (1906) members of the Disciples of Christ. There are 6



Thomas Aquinas (*c.* 1225–1274). (See p. 162.)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LE GRAND ARNAULD par sa Science
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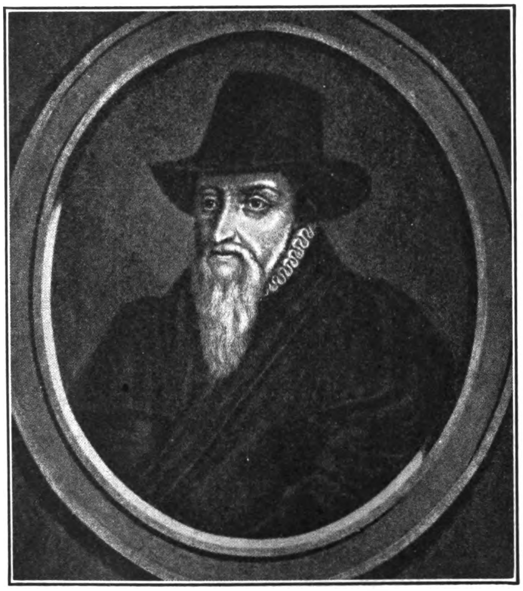
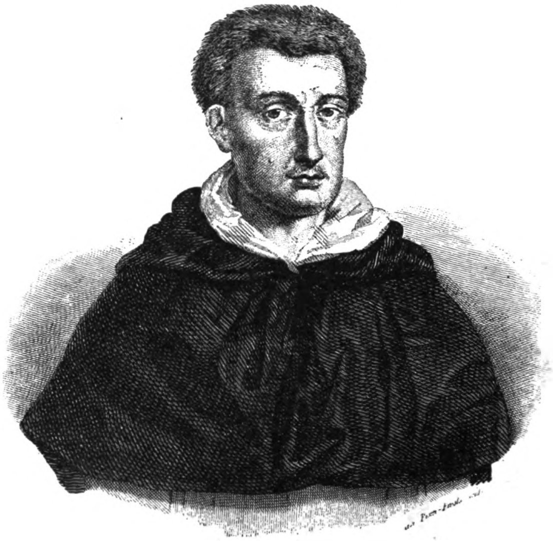
Antoine Arnauld (1612–1694). (See p. 218.)



Theodore Beza (1519–1605). (See p. 369.)



Thomas Campanella (1568–1639). (See p. 512.)

A GROUP OF THEOLOGIANS — LEADERS IN EDUCATION.

buildings, valued (1906), with grounds and equipment, at $345,000. The total annual income was $24,500. The average salary of a professor is $975. A mine on the campus provides coal. There are (1909) 17 members on the instructing staff, of whom 14 are full professors; the college has 296 students. Thomas E. Cramblet, LL.D., is president of both College and Board of Trustees. C. G.

BETHANY COLLEGE, LINDSBORG, KANS. — A coeducational institution, founded in 1881 and placed under the charge of the Kansas Conference of the Augustana Synod in the following year. Beginning as an academy and passing through the stage of a normal institute, the present title was adopted a few years ago. Graduate, collegiate, normal, fine arts, business, law, academic, and model school departments .are maintained. Students are admitted to the college either by certificate from an accredited high school or by examination requiring approximately 12 points. The school of education or normal department is open to those who already hold a state certificate, or by an examination in the common school subjects. A three years' state certificate is given to graduates who complete the 4-year course in the school of education. Degrees are conferred in the collegiate and graduate departments. There are 10 professors, 27 instructors, and 5 assistants on the faculty.

BETHEL COLLEGE, NEWTON, KANS. — Founded in 1893 by the Mennonites of North America. Students of good character are admitted and graded according to their qualifications. Academic, collegiate, fine arts, and commercial departments are maintained. Two years of college work are given at present. There are 8 professors and 5 instructors on the faculty. Rev. David Goerz is the president.

BETHEL COLLEGE, RUSSELLVILLE, KY. — Organized as the Bethel High School in 1852 by the Baptists Association of Southwestern Kentucky, becoming a college in 1854. It is now part of the Baptist Education Society of Kentucky. Preparatory and collegiate work is given. Approximately 10 points of high school work are necessary for admission to the college. Courses leading to the degrees of Bachelor of Arts and Bachelor of Science are offered. In 1908–1909 there were 26 students in the college. There are 7 professors, 2 assistant professors, and 1 instructor on the faculty. Florian David Perkins, A.B., is the president.

BETHEL FEMALE COLLEGE, HOPKINSVILLE, KY. — Founded in 1854 as the Bethel Female High School; present title adopted in 1890. The majority of the trustees are members of the regular Baptist Church. Literary, scientific, and music courses are offered. Primary and preparatory departments are maintained. Admission requirements to the college are not definitely stated. Degrees are conferred. There is a faculty of 9 instructors. Edward Harrison, LL.D., is the president.

BEVAN, BRIDGET. — See Circulating Charity Schools and Charity Schools.

BEZA, THEODORUS. — A reformer who shared with Calvin the burden of the Reformation movement in Geneva. Born in 1519 at Vezelay, in Burgundy. He was carefully educated by his uncle, first at Paris, and afterwards under Melchior Wolmar at Orleans and Bourges. He studied law at Orleans, and took his degree as licentiate, although his own tastes were more literary than legal. A subsequent life in Paris, not free from irregularities, but not marked by gross excesses, was terminated by an illness which recalled the teachings of his tutor, who had been a member of the Reformed Church. Beza then departed to Geneva, married, and adopted the Reformed faith. He became professor of Greek at Lausanne, and attracted a large following by his lectures on the Epistle to the Romans and the Epistles of Peter. Beza did signal service to the cause of reform by his wonderfully successful translations of the Psalms, as well as his editions and translations of the New Testament; and his noble birth caused him to be repeatedly chosen as an ambassador for the Reformed Church. He approved of the punishment of heretics as civil offenders, and in particular of the monstrous execution of Servetus, which was engineered by his friend and ally Calvin, whose biographer he became. On Calvin's death in 1564 the conduct of the church at Geneva devolved principally on Beza, who retained his full energies to the year 1600, and died in 1605, at the age of 86. In addition to his purely theological works, Beza may have been the author of an admirable *Ecclesiastical History of the Reformed Churches of France*, which appeared at Antwerp in 1580. He presented an uncial manuscript of the New Testament known as the *Codex Bezæ* to the University of Cambridge, and published short treatises on the correct pronunciation of the Greek and Latin languages in 1580 and 1587, and on the pronunciation of French in 1584. P. R. C.

See Calvinism and Education.

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BHASKARA (often called **BHASKARA ACARYA** or **BHASKARACARYA**, *i.e.* Bhaskara the Wise). — The fourth and best known of the great Hindu teachers of mathematics. He was born in 1114 A.D., at Biddur, or Bidae, a city in the Deccan, probably the modern Bidar. He wrote several works on mathematics and astronomy, the best known being the *Lilavati* on arithmetic, the *Bija Ganita* on algebra, and the *Siromani* on astronomy. The *Lilavati* was a profound work for its time, and is still used in the East. By direction of Akbar it was translated into Persian by Faizi in 1587, and it has appeared in print in various editions. It was translated into English by Taylor in 1816 and by Colebrooke in 1817. D. E. S.

BIBELESWORTH, WALTER DE (*fl.* 1270). — We know little of this writer, who appears to have been a Norman tutor of children of noble birth in England in the last quarter of the thirteenth century. His name is, however, important in the history of English education, as he was the author of a textbook for teaching Anglo-Norman to children of the nobility. This work was composed at the request of Lady Dionysia de Monchensy of Swanscombe in Kent. It was written in Anglo-Norman, with an interlined gloss in Latin and English. This metrical work marks a stage in the use of Anglo-Norman in English schools. The use of the tongue in the schools had begun to decay at this date, as is known from the Oxford University Statute printed by Dr. H. Anstey in his *Munimenta Academica Oxon.* (see pp. lxx and 438). The text of Bibelesworth's book is given in Mayer's *Library of National Antiquities* (volume of vocabularies i, 142), edited by Thomas Wright in 1857. There is a manuscript of the work in the library of All Souls' College, Oxford (Ms. 182), which (see *Dict. Nat. Biog.*) differs from the printed text both in the Anglo-Norman verse and in the accompanying English gloss. J. E. G. DE M.

See ANGLO-NORMAN DIALECTS.

BIBLE IN THE SCHOOLS. — England. — Miles Coverdale's Translation of the Bible into English was published in 1535. In 1536, King Henry VIII was made Head of the English Church, and in 1538 his Injunctions required a large copy of the Bible to be placed in every church and exhorted every person to read it. But it must not be supposed that Bible reading reached the schools till much later. There are the two instances of Winchester and East Retford. In the *Injunctions of the Commissioners to Winchester College* in 1547, it was ordered that the Bible be read daily in English "distinctly and apertly in the midst of the hall after dinner every Sunday and Holy Day" — for the space of one hour. Moreover, the warden and schoolmasters in all lectures and readings of profane authors were to "confute by allegation of scriptures" all "sentences" and opinions contrary to the Word of God. The Statutes of East Retford grammar school (1552) require in the second form the teaching of the Scriptures old and new.

In the reign of Queen Mary (1553–1558) an *Inhibition* prevailed against the Scriptures, and no copies of an English Bible were allowed to be printed. It is clear that the English Bible had no position in the English schools till after 1559, when Queen Elizabeth revived the *Injunction* of 1547 authorizing the Bible and the Paraphrases of Erasmus in English on the Gospels to be placed in every church. It was after the return of the exiles from Strassburg, Frankfort, and Geneva, that the veneration for the English Bible set in, and affected the English schools. English knowledge was brought into direct contact with the Biblical education of the Continent, which had gone on continuously from the publication of Luther's translation of the Bible into German, the New Testament in 1522, and the whole Bible in 1534. Similarly in Switzerland the Bible had become a schoolbook. The *Colloquies* of Sebastian Castellion (1543–1551) were entirely devoted to a literary presentation of Biblical stories for the schools, and the *Colloquies* of Corderius (*q.v.*) (1564) were permeated with a scriptural atmosphere, and the introduction of both these *Colloquies* (*q.v.*) into English schools served the double purpose of teaching Latin and familiarizing pupils with the Holy Scriptures.

Direct requirement of Bible teaching in the schools must be traced in school orders and statutes. Thus at Hartlebury (Worcestershire) grammar school, 1565, the statutes require the master and usher to instruct pupils in the knowledge of God and His Holy Word. At Rivington (Lancashire) grammar school (1566), the Bible was to be read on holidays and the long winter nights and other idle times (the school was to contain boarders). At St. Bees (Cumberland), 1583, the New Testament was to be taught. At Heath (near Halifax, Yorkshire) grammar school, *c.* 1600, the statutes require chapters from the Bible to be read publicly, daily. Thus the schools were directly in accord with the national consciousness, and as Puritanism advanced in the seventeenth century, the grammar schools were at their best as pronouncedly religious and scriptural in aim as they were classical. These two aims were easily combined by the usage of the Latin and Greek Testaments side by side with the English version. For the illustration of the authoritative requirements of Bible teaching, it is only necessary to add that the Church Canons (1604) required schoolmasters should take the boys to church on Sunday and Holy Days, where the Bible was read, and on every other day to instill "such sentences of Holy Scripture as shall be most expedient." Since every schoolmaster, public or private, had to possess the Bishop's license before he was allowed to teach, the teaching of the Bible and catechism (*q.v.*) and other Biblical instruction was officially fully provided for. John Brinsley (*q.v.*) in the *Ludus Literarius* (1612) (chap. xxii) describes the method of teaching Bible history in schools, and recommends a textbook, — Eusebius

Pagit's *History of the Bible* (briefly collected by way of question and answer). The boys were to read a page every night and to be exercised in it in the manner of catechism teaching, and he speaks of the "delight" children took in it.

Charles Hoole (in 1660), in every form throughout the grammar school, prescribes the reading of a Latin or Greek chapter of the New Testament. Every boy should take his turn in reading in English a chapter before the whole school. Questions are to be asked on what has been read, and the boys are to be encouraged to "pose" one another on it. The boys of the whole form should carry a *Memoriale Biblicum* in their pocket, by which they may know in what chapters to find any passage.

When the charity schools (*q.v.*) were established at the beginning of the eighteenth century, a textbook was designed for the multitudinous schools (said to have reached later to 2000) by Dr. Talbot, called *The Christian Schoolmaster.* The Bible curriculum included the learning by heart of select Psalms. Instead of hymns they sang Psalms 95, 100, 98, and 67. From the Psalter they proceeded to the New Testament. Those who are "pretty perfect" in reading are to learn, "in convenient portions," the Sermon on the Mount. Some are to be called on to give accounts of Christ's miracles and parables (with the moral applications), and the "remarkable stories in the historical books of the Old Testament. They may read the Old Testament and learn by heart select chapters of the Proverbs or Ecclesiastes and other historical passages as chosen by their masters."

In the nineteenth century the elementary schools of England and Wales were chiefly under the influence of the National Society for Promoting the Education of the Poor in the Principles of the Established Church (*q.v.*) (incorporated in 1817) and the British and Foreign School Society (*q.v.*) (founded in 1813), which was nonsectarian, but religious. Both types of schools taught the Bible. In 1870, the "School Board" system (*q.v.*), consisting of members elected by the ratepayers *ad hoc*, supplemented the previous supply of schools by requiring schools to be erected by public authorities wherever the accommodation was deficient. In schools established by "school boards" no denominational religious teaching could be given, but the Bible could be and ordinarily was taught, though a child could claim exemption. By the education act of 1902, which consolidated the whole system of voluntary schools with those established by the old school boards, so as to bring all Public Elementary schools under the county and municipal councils, substantially the general teaching of the Bible in all elementary schools is left untouched. A section of the population is in favor of a solely secular system (excluding the Bible from the curriculum), whilst another section favors the teaching of the Bible as a literary collection of books. Meantime, the teachers as a whole, in the English secondary and elementary schools, continue Bible instruction, whilst the schools which were formerly voluntary schools continue their denominational teaching (including the Bible), but with a conscience clause in operation.

Germany. — Although religious instruction formed part of the school curriculum in Germany from a very early date, there is no evidence that the use of the Bible was included. The Commandments, the Creed, and the Paternoster, with a catechism, made up the religious instruction. To this was added some knowledge of the essentials of the church service. In fact, it is very probable that the majority of the priests had little knowledge of the Bible. In the sixteenth century George of Anhalt (1507–1553) was able to say, "So far as the pastors and priests are concerned, it (the Bible) would have been extinguished." At a later period it became the policy of the Church to restrict the Bible only to the priests. (See fourth rule of Council of Trent.) The Brethren of the Common Life (*q.v.*) were perhaps among the first within the folds of the Church who attempted to bring the Bible to the people. Gerhard von Zütphen (1367–1398), a friend of Gerhard Groote and himself one of the Brethren, says, "This is the beginning and foundation of Christian public education, that the people read the Bible in the vernacular." In the schools with which the Brethren were connected the Scriptures were taught, according to Sturm (*q.v.*), in the following order: Gospel of St. Matthew, Acts, St John, Pauline Epistles, the Old and New Testaments. But it remained for the Reformed churches to extend the use of the Bible. Long before Luther's days the Hussites had insisted on the importance of a knowledge of the Bible. But it was through the services of Luther and his collaborators that the study of the Bible ultimately became identified with public education. The essence of Luther's ideas on the subject is contained in his *Letter to the Nobles*, "Above all in schools of all kinds the chief and most common lesson should be the Scriptures, and for young boys the Gospel. . . . But where the Holy Scriptures are not the rule, I advise no one to send his child." The process of introducing the Bible was, however, slow, for it was difficult in many cases to secure copies, and in most instances the chief emphasis continued to be placed on the Catechism. The numerous school and church ordinances of the period took up Luther's call, and a reference to religious instruction and the teaching of the Scriptures is contained in nearly all. The Brunswick church ordinance (1528) prescribes vernacular schools with two teachers to give religious instruction; according to the Lübeck church ordinances (1531) teachers in vernacular schools must teach religion; the Pommeranian church ordinances (1538) permit the councils to approve writing schools, provided the Psalms, passages from the Bible, and the Catechism are taught. The Schleswig-Holstein church ordinances (1542) contain the following, "Schools are places where children should be taught and their souls be converted to the Gospel." But it is rare to find the study of the Bible as a whole in schools of any type. This century is remarkable for the appearance of "primers" and "selections from the Bible." Thus Melanchthon's *Handbook for Children* contained the A, B, C, the Paternoster, Ave Maria, Matthew v,vii; Romans xii, John xiii, and Psalm cxxvii. Trotzendorf (*q.v.*) issued a *Rosarium contextum ex rosis deceptis ex Paradiso Domini propositum pueris catechumenis in schola Goldbergensi* (*a rose-garden of roses culled from the garden of the Lord for the religious instruction of boys at the Goldberg School*). Neander (*q.v.*) also issued a similar selection of Biblical passages — *Epitome Chronicorum.* In 1577 there appeared a *Biblischer Auszug oder Historien mit Bildern* (*Biblical selections or Histories with pictures*) by H. Beyer of Frankfort, a type of book which soon gained in popular favor. Thus the schools rather employed the selections than the Bible itself, except in the upper classes of Latin schools, where, however, it was studied in Latin rather as a medium of language instruction in accordance with the suggestions of Melanchthon. The selections most frequently made included a few Psalms, the Proverbs of Solomon, and parts of the Gospels which would lend themselves to easy memorization and would serve to inculcate moral lessons.

If the sixteenth century saw the introduction of biblical selections, the next two centuries were periods in which biblical histories without number flourished, with and without illustrations. Duke Ernst of Gotha (*q.v.*) had a pictorial biblical history published, and the *School Method* provided that " If the Bible or biblical histories can be had in schools," then the older children should read in them, but only those chapters which are read in church." Spener (*q.v.*) also advocated the use of pictures, and particularly the reading of the Old Testament. Francke (*Kurzer und Einfaltiger Unterricht*) would teach the Bible as soon as children could read, while Comenius (*Great Didactic*, chap. 29) regarded " the Holy Scriptures as the alpha and omega for all Christian schools." Among the most popular biblical histories were those of Gesenius (*Biblische Historien des alten und neuen Testaments*, 1658, 3d ed. 1719), and Hübner (*Zweimal zwei und fünfzig auserlesene biblische Historien*, 1714). The Bible itself did not become a common reading book for any class of society until the foundation at Halle of the Canstein Institution, 1712. The condition of things at the beginning of the eighteenth century is illuminated by the statement in the Württemberg School Ordinance of 1729 that " many children never see a Bible in their lives or know what it is."

The period of enlightenment saw a continuance of the issue of biblical histories but of a new type. While the older histories had aimed to reproduce the tone and language of the Bible, the newer publications tended to be either extremely rationalistic or mere theological disquisitions. Dinter (*q.v.*) objected to both types, and insisted on the personal appeal of the Bible, which he regarded as the source of Christian faith, moral advice, as good practice in reading, excellent for formation of taste, and as a center round which to group other subjects. Edicts were not wanting to introduce the teaching of the biblical histories in schools. Thus edicts were issued in Prussia in 1716, Saxony 1724, Brunswick 1733. Biblical maps and pictures were used, and all manner of subjects were grouped round the instruction in Scripture. The Prussian *Generallandschulreglement*, 1763, decreed that the teacher should tell stories from the Bible and should make the necessary applications. This measure was reinforced in 1773, and the New Testament was to be taught in the lower and the Old Testament in the upper grades. In 1814 a Prussian Ordinance put a check to the use of the rationalistic histories, and insisted that all children in elementary schools should know the New and the Old Testament by the time of confirmation. The histories, however, continued to be used until the Regulations of 1854 put an end to the use of anything but the Bible. In 1872 the decree enforced the teaching of stories from Genesis, the lives of Moses, David, and Jesus, and interesting parts of the Bible as a whole in biblical language in the lower grades, and of the Bible itself in the upper grades. Similar provisions were made in Saxony in 1874. The ability with which children of 14 can repeat passages from the Bible, and quote very frequently chapter and verse, is adequate testimony to the care and attention which are now paid to the teaching of the " only and peculiar Book " of Luther in the elementary schools. Four hours a week are given to religious instruction in the elementary schools of Prussia, and these include Bible teaching. In the high schools a similar distribution of the work, scriptural stories in the lower sections, parts of the Old and New Testament in the middle, and an intensive study of the whole Bible in the upper sections, is made, but only 2 hours a week are devoted to religious instruction as a whole in each class.

France. — As in all other countries, so in France, education in the Middle Ages was on a religious basis, and remained under clerical control down to modern times. The Statutes of the University of Paris of 1598 contain an article to the effect that " all the heads of colleges shall see to it that the children and youth be instructed in religion by capable teachers and clergy, and that on each day at the usual hour according to the custom established by our ancestors divine service be performed and the scholars assist thereat not only on Sundays and festival days, but also on other days." So much of the Bible was taught as was thought proper by the Catholic hierarchy. In the eighteenth century began the discussions on the value of religious instruction for moral training. The strongest advocate for the retention of religious instruction was Rollin in *Traité des Études* (1726), who originated the expression, representative of the opinion of the university at that time, " no instruction without education, no education without religion." In 1762, at the time of the agitation against the Jesuits, the Parliament asked the universities to frame a course of study embodying religion, morals, and sciences. The Revolution tended to exclude religion entirely from the schools and put in its place " morals and natural law " (1792) and " republican morals " (1794). As soon as public opinion could express itself freely, it appeared that many parents refused to send their children to " irreligious " schools. In 1816 a royal ordinance reintroduced religion into the school. Biblical instruction was included under the term " sacred history " (*histoire sainte*). In another decree of 1816 it was demanded that all primary teachers must know sacred history, including the Old and New Testaments. In 1833 the same provision was renewed, and the importance attached to the subject may be realized from the following statement, " geography and history are necessary ideas and form part of religious instruction which necessarily supposes some acquaintance with this field " (1834). In 1836 it was emphasized in an ordinance of June 23 that religious education forms part of primary instruction. Similar decrees and ordinances were reported in 1850 and 1851. On Aug. 17, 1851, religious instruction was defined as including catechism and elements of sacred history and the reading of the gospel. By the secularizing law of Mar. 28, 1882, moral and civic instruction replaced religion. The public primary schools are open to all, and ought to be independent of all denominations. Thursday, however, was to be free, and on that day children could be sent to their several denominational institutions for religious instruction. Private schools were still permitted to give religious instruction. In 1887 teachers belonging to religious corporations were excluded from the public schools. About the same time the references to God were eliminated from the programs for moral instruction. In secondary schools religious instruction was removed from the class time in 1880, but by a decree of 1881, the wishes of parents were allowed to regulate the system by which the clergy were admitted to give instruction in religion outside school hours.

By the associations law of July 1, 1901, religious orders had to apply for special authorization from the government for the continuance of their existence and work, and the government exercised its power to refuse authorization. By the law of July 8, 1904, all teaching orders were to be suppressed within ten years. The result is that the State now has a monopoly in schools, and religious instruction, including the Bible, is entirely eliminated.

United States. — The reading of the Bible in the public schools either by the teacher or the pupils, usually as a form of opening or closing exercise, has long been a common feature of American public education. In a number of the colonies the ability to read the Bible was the standard of efficiency, and one of the evident aims of public instruction as expressed in legislative enactments. (See COLONIAL PERIOD IN AMERICAN EDUCATION.) Usually the King James version has been employed for this purpose, and frequently in addition thereto or in lieu thereof specially prepared texts containing extracts therefrom have been used.

Since about 1840 considerable objection has been raised to this practice, especially by those who have not belonged to the dominant religious faith of given communities. The opposition has been strongest in our larger cities. Frequently individual communities have attempted to settle such controversies on a purely political or majority basis. Again, various forms of compromises have been resorted to, by city, county, and district boards of educational control. From the local communities the contest has been carried to the state legislatures, to the voice of the people of entire states.

Two general lines of policy can be detected in the state legislation dealing therewith. One forbids the use of any books in the public schools calculated to favor the religious tenets of any particular religious sect, leaving it to the courts to determine in any particular case whether or not a book was sectarian. To this class belong the enactments as noted of the following states: Alabama (Act Mar. 4, 1903), Arizona (Sess. Laws 1879, No. 61, sec. 38), Arkansas (Act Apr. 29, 1873, sec. 52), California (Act May 3, 1855), Colorado (Gen. Stat. 1883, ch. xcvii), Idaho (Sch. Laws 1907, p. 82), Indiana (Acts 1880, p. 74), Kansas (Mar. 19, 1897, ch. 179, sec. 4), Kentucky (Apr. 1, 1872), Massachusetts (Mar. 10, 1827), Mississippi (Sch. Laws 1906, sec. 4595), Montana (Act Jan. 12, 1872), Nevada (Compiled Laws 1900, sec. 1323), New Hampshire (Rev. Stat. 1842, ch. 73, sec. 12), New York (Apr. 18, 1843), North Carolina (revisal 1873, ch. 68, sec. 59), North Dakota (Pol. Code 1899, sec. 694), Oklahoma (Laws 1908, No. 331), South Carolina (Revised Stat. 1873, ch. xxxv, sec. 5), Tennessee (Act Apr. 13, 1899), Virginia (certain counties) (Act Mar. 20, 1847), Washington (Act Nov. 28, 1883), Wisconsin (Act Mar. 31, 1883).

The other policy, while forbidding the use of sectarian books, has left the way open for the use of the Bible, either by declaring that it should not be considered a sectarian book nor excluded, or by leaving its use to the option of individual communities. Sometimes it has made the use of the Bible mandatory, but has provided that the reading therefrom shall not consume more than a specified number of minutes daily, and shall not be accompanied by any comments. Sometimes it has provided that those who object to reading the particular version employed, or being present while it is being read, because of conscientious scruples, shall be excused therefrom. No law has ever been passed by any state legislature, specifically excluding the Bible by name from use in the public schools.

The following states have declared by law that the Bible should not be excluded, or have made its use mandatory in the schools: Florida (Act Jan. 30, 1869), Georgia (Code 1895, sec. 1365, Indiana (Act Mar. 6, 1865), Iowa (Revised Stat. 1873, sec. 1764), Louisiana (Revised Stat. 1870, sec. 1288), Massachusetts (Gen. Stat. 1859, ch. 38, sec. 27), Mississippi (Act July 4, 1870), New York (city) (Act May 7, 1844), North Dakota (Pol. Code 1899, sec. 754), West Virginia (Act Feb. 26, 1866).

The following states have made the use of the Bible optional or permissive, according to the wishes of each community: Kansas (Act Apr. 7, 1876), New Jersey (Act Apr. 30, 1844), North Dakota (Pol. Code 1899, sec. 754), Oklahoma (Act Feb. 19, 1895), South Dakota (Pol. Code 1903, sec. 2423).

The following states have provided by law for excusing those who have objections on conscientious grounds from attendance on the reading of the Bible: Florida (Act Jan. 30, 1869), Iowa (Rev. Stat. 1873, sec. 1764), Louisiana (Rev. Stat. 1870, sec. 1288), Massachusetts (Act Mar. 6, 1862), North Dakota (Sess. Laws 1890, ch. 62, sec. 134).

The above lists of citations to legislation in various states are given to illustrate the various ways in which legislatures have sought to deal with a common problem. The lists are typical, not entirely complete, nor do the citations represent the present status in all cases.

Not only the laws but the constitutions as well of a large majority of the states have felt the influence and show the effects of this opposition to the reading of the Bible in the public schools. And it is to the constitutions, together with the judicial decisions interpretative thereof, rather than to the laws, that we must look in order to discover the final attitude of the American states upon this question. For questions involving, as this one does, the religious element, individual religious rights, are so fundamental in their nature that nothing short of an appeal to the fundamental law of the land can afford a solution. The laws represent as it were an intermediate step, an attempt to deal with a new problem. The culminating stage has been the incorporation of provisions in our state constitutions dealing therewith.

These constitutional provisions are much less specific than are those contained in the laws. Only one state, Mississippi, mentions the Bible specifically in this connection, in her constitution. The constitution of 1890, Art. 3, sec. 16, reads as follows: "No religious test as a qualification for office shall ever be required; and no preference shall be given by law to any religious sect or mode of worship; but the free enjoyment of all religious sentiments and the different modes of worship shall be held sacred. The rights hereby secured shall not be construed to justify acts of licentiousness injurious to morals or dangerous to the peace and safety of the state, or to exclude the Holy Bible from use in the public schools of this state." Only one state constitution, that of Idaho, specially mentions sectarian textbooks. In the constitution of 1899, Art. IX, sec. 6, states: "No religious test or qualification shall ever be required of any person as a condition of admission into any public, educational institution of the state, either as teacher or student; and no teacher or student of any such institution shall ever be required to attend or participate in any religious service whatever. No sectarian or religious tenets or doctrines shall ever be taught in the public schools, nor shall any distinction or classification of pupils be made on account of race or color. No books, papers, tracts, or documents of a political, sectarian, or denominational character shall be used or introduced in any schools established under the provisions of this article, nor shall any teacher in any district receive any of the public school moneys in which the schools have not been taught in accordance with this article."

All of our state constitutions, however, guarantee religious freedom; 11 directly forbid sectarian instruction in the public schools; 28 forbid the appropriation of public money to religious or sectarian schools. So the question as to whether the Bible shall be used in or excluded from the public school becomes in all the states but Mississippi a question for the courts to determine, on constitutional grounds. If its use constitutes sectarian religious instruction, if its contents favor the tenets of any particular religious faith, or if its use in a public school constitutes such school a place of religious worship, or a religious seminary, or if such use violates the principle of religious freedom, then under the existing constitutions the Bible, as well as any other book so violating the fundamental law of the land, must be excluded from the public schools.

The court decisions in this matter are numerous and conflicting. The most important ones upholding the reading of the Bible are the following: —

In the case of McCormick *v.* Burt decided in Illinois in 1880, a Catholic child was suspended from school for non-observance of a rule of the board of trustees requiring all pupils to lay aside their books and remain quiet during 15 minutes in the morning while the teacher read as a morning exercise from the King James version of the Bible. Pupils were not required to be present during the reading, but if present must observe the rule. The action of the board in suspending the child was upheld by the court. (95 Ill. p. 263.)

In the case of Moore *v.* Munroe and another it was held by the Supreme Court of Iowa in 1884 that a parent having two children in a public school, where the Bible was read by the teachers every morning along with other religious exercises, but whose children were not required to attend such reading nor take part therein, was not entitled to an injunction preventing such reading and religious exercises. (N. W. Rep. 20, p. 475.)

The supreme court of Kansas decided a somewhat similar case in 1904 in the case of Billard *v.* Board of Education (76 Kan. p. 422). In 1905 the Supreme Court of Kentucky held in the case of Hackett *v.* Brockville Graded School District that a public school opened with prayer and the reading without comment of passages from the King James translation of the Bible, during which pupils were not required to attend, was not a place of worship nor were its teachers ministers of religion within the meaning of constitution, Par. 5, providing that no person should be compelled to attend any place of worship or contribute to the support of a minister of religion.

In Donahue *v.* Richards *et al.* the Supreme Court of Maine held in 1854 that the power to select books and require them to be read was vested by law in the school committee. That the use of the Bible as a reading book was not interference with religious belief any more than was reading the mythology of Greece or Rome. Furthermore the requirement of uniformity in reading books was a reasonable request. A Catholic child therefore who was expelled from school by the school committee for refusing to read from the Protestant version of the Scriptures, alleging conscientious scruples as the grounds of refusal, and who offered to read from the Douay version, was not entitled to any redress. (Me. 38, p. 379.)

The police court of Boston in the case of Commonwealth *v.* Cook decided in 1859 that a teacher in the public schools of Boston had a right to enforce a regulation of the school committee requiring pupils in the public schools to learn the Ten Commandments and repeat them once a week, and was justified in inflicting corporal punishment upon a child who refused to repeat the Ten Commandments, even though the refusal was based on conscientious objection on the part of the child to the version of the Bible used, and even though he acted under the direction and with the authority of the father in making such refusal. (7 Am. L. Reg. p. 417.)

In Pfeiffer *v.* Board of Education of Detroit, 1898, it was held that the use in the public schools for 15 minutes at the close of each day's session, as a supplemental textbook on reading, of a book entitled "Readings from the Bible," emphasizing the moral precepts of the Ten Commandments, when the teacher is forbidden to make any comment upon the matter therein contained, and is required to excuse from that part of the session any pupil upon application of his parent or guardian, is not a violation of the state constitution. (118 Mich. 560.) A somewhat similar decision was given in Pennsylvania in 1885 in Hart *v.* School District of Sharpsville; and in Texas in 1908 in Church *v.* Bullock. (109 S. W. p. 115.)

In Nessle *v.* Hunn *et al.* the Mahaning County Court of Common Pleas of Ohio decided in 1894 that, as the legislature had placed the management of the public schools exclusively in the control of directors, trustees, and boards of education, the courts had no authority to interfere against a regulation duly adopted by the board of education requiring portions of the Bible to be read in the schools of the district as an opening exercise. It was not in violation of the constitution of Ohio nor of the United States. (*Nisi Prius* Repts. Vol. 1, 1894–1895, p. 140.)

The most notable decisions opposing the reading of the Bible in the public schools are the following: —

In Pfeiffer *v.* The Board of Education of Detroit, a decision which we have already referred to as sustaining the right of the Board of Education to introduce into the public schools a book called "Readings from the Bible," there was a dissenting opinion filed by Judge Moore which reads in part as follows: "The elements of our population are so diverse, comprising as it does Protestants, Roman Catholics, Hebrews, atheists, orthodox Christians, heterodox Christians, and all shades of religious belief — that no system of religion can be taught which would not be objectionable to many of them. It is said that the school board has removed all objection to the religious exercises embraced in the stated reading of this religious book by excusing those children, whose parents may request it, from joining in it. If it is the duty of the schools under the ordinance of 1787 to teach religion, it is not easy to see how this duty can be abdicated: how some can be excused from it. Children should be taught to fear God and to love their fellow men. They should be made familiar with the truths of the Bible. They should be instructed to remember their Creator in the days of their youth, and to observe his commandments. But this is a branch of education which is not within the province of the State. It belongs to the parents, the home, the Sunday school, the mission, and the church." (118 Mich. p. 560.)

In State *ex rel.* Freeman *v.* Scheve, a decision rendered by the supreme court of Nebraska in 1903 is contained the following: "The point where the courts may rightfully interfere to prevent the use of the Bible in a public school is where legitimate use has degenerated into abuse, — where a teacher employed to give secular instruction has violated the constitution by becoming a sectarian propagandist. The Bible was not read as mere literature. The reading, the prayers, and the hymns were intended to be devotional. The teacher felt it was not right to open school in any other way. It was a matter of conscience with her. It was an act of worship. The court holds this to be sectarian instruction. Exercises by a teacher in a public school, in a school building, in school hours, and in the presence of the pupils, consisting in the reading of passages from the Bible, singing of songs and hymns, and offering prayer to the Deity, in accordance with the doctrines, beliefs, customs, or usages of sectarian churches or religious organizations are forbidden by the constitution of this state. The law does not forbid the use of the Bible in either version in the schools. Because its use may be abused is no reason for shutting it out. The alleged violation must in every case be proved. Enforced attendance upon religious service is forbidden by the constitution, and pupils in a public school cannot be required either to attend such services or to join in them. A teacher in a public school being vested during school hours with a general authority over his pupils, his requests are practically commands. The right of the relator has been infringed. Without his consent and over his protest, his children have been compelled to attend Divine worship, and to participate in it." (93 N. W. p. 169.)

In Stevenson *v.* Hanyen, a Pennsylvania case decided in 1895, objection had been made to the alternate reading of the Bible as a morning exercise, the reciting of Bible passages and the singing of Gospel hymns, on the grounds that this constituted sectarian instruction. The objection was upheld by the court. (Penn. Co. Court Repts., Vol. XVI, p. 186.)

A lengthy decision rendered by a Wisconsin court in 1890 in the case of State *ex rel.* Weiss and Others *v.* The District Board of Edgerton, is probably the most important, or at least the most quoted, of these decisions. The court found as follows: —

> The use of any version of the Bible as a textbook in public schools and the stated reading thereof in such schools by the teachers, without restriction, though unaccompanied by any comment, has a tendency to inculcate sectarian ideas within the meaning of Sec. 3, ch. 152, of the Laws of 1883, and is sectarian instruction within the meaning of Sec. 3, Art X, of the constitution. The fact that the children of the petitioners are at liberty to withdraw from the schoolroom during the reading of the Bible does not remove the ground of complaint. The stated reading of the Bible as a textbook in the public schools may be worship, and the schoolhouse thereby become, for the time being, a place of worship within the meaning of Sec. 18, Art. I, of the constitution, and to such use of the schoolhouse the taxpayers, who are compelled to aid in its erection and in the maintenance of the school, have a legal right to object. Children of poor parents who are by law practically obliged to attend the public schools would, if such reading were permitted, be compelled to attend a place of worship contrary to Sec. 18, Art. I, of the constitution. Such reading being religious instruction, the money drawn from the state treasury for the support of a school in which the Bible is so read is for the benefit of a religious seminary within the meaning of said section. In considering whether such reading of the Bible is sectarian instruction, the book will be regarded as a whole, because the whole Bible, without exception, has been designated as a textbook for use in the Edgerton schools, and the claim of the school board is, substantially, that the whole contents thereof may be so read therein if the teachers so elect. This being so, it is quite immaterial if the portions thereof set out in the return as the only portions thus far read are not sectarian. The term sectarian instruction in the constitution manifestly refers exclusively to instruction in religious doctrines, and the prohibition is only aimed at such instruction as is sectarian; that is to say, instruction in religious doctrines which are believed by some religious sects and rejected by others. Hence to teach the existence of a Supreme Being of infinite wisdom, power, and goodness, and that it is the highest duty of all men to adore, obey, and love him, is not sectarian, because all religious sects so believe and teach. The instruction becomes sectarian when it goes further and inculcates doctrines or dogma concerning which the religious sects are in conflict. This we understand to be the meaning of the constitutional provision. Furthermore, there is much in the Bible which cannot be characterized as sectarian. There can be no valid objection to the use of such matter in the secular instruction of pupils. Much of it has great historical and literary value which may be thus utilized without violating the constitutional prohibition. It may also be used to inculcate good morals — that is, our duties to each other — which may and ought to be inculcated by the district schools. No more complete code of morals exists than is contained in the New Testament which reaffirms and emphasizes the moral obligations laid down in the ten commandments. Concerning the fundamental principles of moral ethics, the religious sects do not disagree. (76 Wis. p. 177.)

The most recent decision, that of the supreme court of Illinois in June, 1910, in granting a writ of mandamus to the Roman Catholic petitioners of Winchester, Scott County, the Court said, in granting the writ denied by the lower court, —

> The exercises mentioned in the petition constitute worship. They are the ordinary forms of worship usually practised by Protestant Christian denominations. Their compulsory performance would be a violation of the constitutional guaranty of the free exercise and enjoyment of religious profession and worship. One does not enjoy the free exercise of religious worship who is compelled to join in any form of religious worship. If these exercises of reading the Bible, joining in prayer, and the singing of hymns were performed in a church, there would be no doubt of their religious character, and that character is not changed by the place of their performance. If the petitioners' children are required to join in the acts of worship, as alleged in the petition, they are deprived of the freedom of religious worship guaranteed to them by the Constitution. The wrong arises not out of the particular version of the Bible or form of prayer used, but out of the compulsion to join in any form of worship. The free enjoyment of religious worship includes freedom not to worship.

In general then we may say that the Bible is read in the public schools of most of our states, but usually only as an opening or closing exercise, in which no comment may be made by the teacher; that whether it shall be read or not is largely determined by the local authorities; that those children who object to attendance on such reading are excused therefrom; that in some states the court decisions prohibit its use in the schools, and that in those where the decisions allow it, the purely formal manner in which it is compelled to be used has detracted from its use a considerable portion, if not all, of the religious and moral value once commonly attributed thereto, and that the tendency is to reduce it more and more to a purely literary level.

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See MORAL EDUCATION; RELIGIOUS EDUCATION; REFORMATION, EDUCATION AND THE.

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SICARD, L'ABBÉ. *L'Éducation Morale et Civique avant et pendant la Révolution.* (Paris, 1884.)
WATSON, FOSTER. *The English Grammar Schools up to* 1660. (Cambridge, 1908.)

The literature concerning the American experience is chiefly controversial in character, and is found widely scattered in periodicals (see Poole's *Index*). Among these may be noted the following: —

Atlantic Monthly, Vol. 25, p. 638. H. James.
Forum, Vol. 7, pp. 52–66. H. E. Manning.
Forum, Vol. 7, pp. 119–133. G. P. Fisher.
N. E. A. *Proceedings:* 1858, p. 10; 1869, p. 19; 1872, p. 20; 1875, p. 122; 1886, p. 141; 1888, p. 67; 1889, p. 143; 1891, p. 168.

The additional references of legal character are given in the text of the article.

BIBLIOGRAPHICAL INSTRUCTION. — The history of systematic bibliographical instruction begins with the recommendation made in 1870 by Ralph Waldo Emerson that professorships of books should be established in colleges. The first institution to act upon this suggestion was the University of Michigan, where a course in "historical, material, and intellectual bibliography" was first offered one hour a week during the second semester in 1882.

Instruction in this subject has been more fully developed at Cornell University than elsewhere. There the following three courses are offered (1909–1910).

1. *Introduction to the Use of Books.* — A systematic study of bibliographies, indexes, dictionaries, cyclopedias, etc.; including the principles of classification, cataloguing, indexing and preparing manuscript for printing. Lectures and exercises. First term. One hour.

2. *Laboratory Work.* — Covering the same subjects as course 1, intended for students wishing more of the practical work. Open to students who have had course 1. Second term. One hour.

3. *General Bibliography.* — The materials and forms of books in ancient times; books in the Middle Ages; block books, early printed books, illustrated by examples of manuscripts and incunabula; book illustration, book bindings; form notation; systems of classification and cataloguing; general bibliographical aids. Lectures. Second term. One hour.

The object of this instruction is to give (1) elementary instruction regarding the use of books, — reading, reference books, library methods; (2) advanced instruction regarding the history of books and libraries. Professional and technical instruction in this subject relates specifically to library science (*q.v.*), printing, etc.

The need of instruction regarding the use of books in secondary schools, especially for those pupils who will not enter college, has been recognized in several urban schools. The course given in the Detroit Central High School since 1903 may be regarded as typical. This provides for 8 40-minute lessons during the 4 years' course upon the following subjects: (1) Simple indexes. (2) More complex indexes. (3) Dictionaries and simple handbooks of reference. (4) Encyclopedias, general and special, together with a few valuable collections of encyclopedic arrangement. (5) Magazine indexes. (6) Annuals and a few special indexes. (7) A very few reference books published by the United States Government. (8) A review of the whole subject, with carefully selected reference questions for practice.

W. D. J.

References: —

AMES, ANNE S., and JOSEPHINE A. RATHBONE. Instruction in the use of reference books and libraries, in High Schools. *Library Journal,* Vol. 23; C 86–91, Aug., 1898.
DAVIS, R. C. Teaching bibliography in colleges. *Library Journal,* 11; 289–294, Aug.–Sept., 1886.
HOPKINS, FLORENCE M. Methods of instruction in the use of High School Libraries. *Proc. N. E. A.,* 1905, pp. 858–864. The place of the library in High School education, *Library Journal,* 35; 55–60, Feb., 1910.
KOOPMAN, H. L. College instruction in bibliography. *Library Journal,* 22; C 165–166.

BIBLIOGRAPHIES OF EDUCATION. — In addition to the references cited at the end of each article of this cyclopedia on which there is literature of importance, a few general bibliographies of education should be mentioned. A few of these are of first importance, and are very useful to the student. Many of the books and articles cited at the end of the general articles also contain special bibliographies of importance. Reference to such special bibliographies is given whenever one exists. For additional references, some of the following general bibliographies, and in particular the annual bibliographies, will prove very useful.

I. **General Bibliographies of Education**:
1. **Hall, G. Stanley.** *Bibliography of Education*, 309 pp. (Boston, 1886.) A classified list of books and articles, in English, German, and French.
2. **Monroe, Will S.** *Bibliography of Education*, 202 pp. (New York, 1897.) International Educational Series, No. 42. A list of 3200 books and pamphlets in the English language only, classified under about 125 topics with author and subject index.
3. **Lawrence, Isabel.** *Classified Reading*, 405 pp. (St. Cloud, Minn., 1898.) Divided into seven sections, as follows: —
   A. Pedagogy and Psychology, 36 pp.
   B. Child Study, 40 pp.
   C. Geography, 88 pp.
   D. History, 132 pp.
   E. English, 50 pp.
   F. Nature Study, 55 pp.
   G. Miscellany.

Very full and useful on some subjects; very incomplete on others. (Reviewed at length in *School Review*, Oct., 1899, p. 478.)

4. **Buisson, F.** *Dictionnaire de pédagogie et d' instruction primaire*, Pt. I, t. 1, pp. 194–251. (Paris, 1886–1887.) List of French educational works, 1491–1878.
5. **Arndt, Otto.** *Verzeichnis der pädagogischen Zeitschriften, Jahrbücher, und Lehrerkalender Deutschlands.* (Berlin, 1893.)
6. **Loos, Joseph.** *Encyklopädisches Handbuch der Erziehungskunde.* 2 vols. (Leipzig, 1906–1908.) Numerous citations to books follow each article.
7. **Rein, W.** *Encyclopädisches Handbuch der Pädagogik*, 2d Ed., 10 vols. (Langensalza, 1903–1909.) Numerous citations to German literature at the close of each article.

II. **Special Catalogues of Important Educational Libraries**: —
1. *Books on Education in the Libraries of Columbia University.* 435 pp. (New York, 1901.) A classified list of about 13,000 titles, and a very useful bibliography.
2. **MacDowell, Lillian Ione.** *Catalogue of the Pedagogical Library of the Board of Education of Philadelphia.* 525 pp. (Philadelphia, 1907.) An analytical dictionary catalogue of a library of over 10,000 volumes of almost entirely English works.
3. **Musée Pédagogique.** *Catalogue des ouvrages et documents.* 2 vols., 1886; supplement, 1889. (Paris.)
4. *Catalogue de la bibliothèque centrale du ministère de l'intérieur et de l'instruction publique*, t. 2, *Enseignement*, 1165 pp. 4to. (Brussels, 1905.) A list of 6742 titles, closely classified, with a good general index.
5. **Comenius Stiftung.** *Katalog der pädagogischen Centralbibliothek.* List of 60,000 titles, mostly German. (Leipzig, 1892.)
6. **Hunziker, O.** *Katalog der Bibliothek des Pestalozzianums zu Zurich.* (Zurich, 1894.)

III. **Annual Bibliographies of Educational Literature**: —
1. *Das gesamte Erziehungs- und Unterrichtswesen in den Ländern deutscher Zunge.* (Berlin.)
   A monumental work of which only 4 vols. were issued.
   Everything issued in German included; notes very full.

Vol. I, for 1896. Issued in 1896. 113 + 1242 pp.
Vol. II, for 1897. Issued in 1900. 47 + 1100 pp.
Vol. III, for 1898. Issued in 1902. 35 + 799 pp.
Vol. IV, for 1899. Issued in 1903. 38 + 823 pp.

2. *Schoolmasters' Year Book and Directory.*
   Since 1900 this has become the most useful British reference book on educational topics. The bibliography of "Books of the Year" is a useful list.
3. **Wyer, J. I.** *Recent Educational Bibliography.*
   An annual list of published bibliographies, 1897–1907. Published as follows: —

For Year	Published in	Pages
1897	School Review, Oct., 1898	4
1898	School Review, Oct., 1899	5
1899	School Review, Oct., 1900	10
1900	School Review, Oct., 1901	9
1901	School Review, Oct., 1902	10
1902	School Review, Oct., 1903	8
1903	School Review, Oct., 1904	9
1904	School Review, Oct., 1905	6
1905	School Review, Oct., 1906	7
1906	School Review, Oct., 1907	7
1907	Bull. No. 3, 1908, U.S. Bureau of Education	2

To be published annually hereafter by the United States Bureau of Education as a part of the Bibliography of Education for each year. Valuable lists, and should be consulted. They form a supplement to the list of 300 bibliographies of educational topics in the report of the U. S. Commissioner of Education, 1893–1894, Vol. 2, pp. 1701–1722.

4. **Wyer, J. I.**, assisted by Miss I. E. Lord the first 6 years; by Miss M. E. Leonard the seventh year; Miss M. G. Brown the eighth year; and Miss M. L. Phelps the ninth year. *Annual Bibliography of Education*, for each year 1899–1907. To be continued by the United States Bureau of Education, beginning with 1908. The most valuable annual list published, and should be consulted in all cases. Arranged and classified according to the Dewey decimal system, with a good index. Published as follows: —

For Year	Published in	Size	Titles
1899	Educ. Review, April, 1900 .	59 pp.	618
1900	Educ. Review, April, 1901 .	40 pp.	481
1901	Educ. Review, June, 1902 .	25 pp.	319
1902	Educ. Review, June, 1903 .	42 pp.	367
1903	Educ. Review, June, 1904 .	52 pp.	423
1904	Educ. Review, June, 1905 .	52 pp.	466
1905	Educ. Review, Sept. and Oct., 1906	89 pp.	665
1906	Educ. Review, June, 1907 .	46 pp.	417
1907	Bulletin No. 3, 1908, U.S. Bu. Educ.	65 pp.	459
1908	Bulletin No. 9, 1909, U.S. Bu. Educ.	134 pp.	1209

The scope of these annual bibliographies may be shown by reference to the classification given in the article on Library Classification (*q.v.*).

IV. **Special Indexes to Important Publications**: —
1. *Index to Barnard's American Journal of Education.* Published by the Bureau of Education, Washington. (1892.)
2. *Index to the Proceedings of the National Educational Association*, 1857–1906. 211 pp. (Winona, Minn., 1907.) An index by authors, titles, and subjects. Supersedes the Index of 1897.
3. **Nelson, C. A.** *Analytical Index to Volumes* 1–25 *of the Educational Review*, 218 pp. (New York, 1904.)
   A valuable subject and author index.
4. *Index to the Reports of the U. S. Commissioner of Education*, 1867–1907, 103 pp. (Washington, 1909.) Bulletion No. 7, 1909, of the Bureau of Education.
5. **Poole, W. F.**, and **Fletcher, W. I.** *Annual Literary Index.* Annual since 1892. Years before 1892 collected in the *Index to Periodical Literature*, by the same editors. (Index to all current magazine articles since 1907, the Annual Library Index by W. I. Fletcher.)

V. A FEW SPECIAL BIBLIOGRAPHIES OF IMPORTANCE : —

(*a*) Child Study.

1. WILSON, L. N. *Annual Bibliography of Child Study.*

Very full and complete lists, published in the *Pedagogical Seminary* each year, beginning with 1898, as follows : —

FOR YEAR	NUMBER PUBLISHED IN			TITLES
1897	April, 1898 ;	V,	pp. 541–589	*c.* 600
1898	Sept., 1899 ;	VI,	pp. 386–410	333
1899	Dec., 1900 ;	VII,	pp. 526–556	441
1900	Dec., 1901 ;	VIII,	pp. 515–537	331
1901	Dec., 1902 ;	IX,	pp. 521–542	307
1902	Dec., 1903 ;	X,	pp. 514–536	344
1903	July, 1904 ;	XI,	pp. 83–118	486
1904	Sept., 1905 ;	XII,	pp. 304–334	429
1905	Sept., 1906 ;	XIII,	pp. 374–397	305
1906	Sept., 1907 ;	XIV,	pp. 329–351	362
1907	Sept., 1908 ;	XV,	pp. 400–429	442

2. RHOADES, LILLIAN IONE. *Bibliography of Child Study*, 128 pp. (Philadelphia, 1901.) A list of 1100 titles in English. Arrangement very good. Selections made with care. A very useful list.

3. SMITH, T. L. *Bibliography of Articles relating to the Study of Childhood and Adolescence which have been published in the Pedagogical Seminary and the American Journal of Psychology.* In the *Pedagogical Seminary* for Sept., 1907, Vol. XIV, 203 titles.

(*b*) School Hygiene.

1. BURNHAM, W. H. Bibliography of School Hygiene ; in *Proceedings of the N. E. A.* 1898, pp. 505–523. (436 titles, mostly foreign.)

2. WEHMER, R. *Enzyklopädisches Handbuch der Schulhygiene.* (Leipzig, 1904.)

(*c*) History of Education.

1. CUBBERLEY, ELLWOOD P. *Syllabus of Lectures on the History of Education, with Annotated Bibliographies.* (2d ed., New York, 1904.)

A classified and annotated bibliography of the history of education. The second edition contains suggestions as to reading and the use of the books. The most complete bibliography of the history of education in English.

(*d*) Industrial Education.

RICHARDS, C. R. *Selected Bibliography on Industrial Education.* Bull. No. 2 of the National Society for the Promotion of Industrial Education. 32 pp. (New York, 1907.)

(*e*) State School Systems.

ELLIOTT, EDWARD C. *State School Systems.*

Vol. I, for 1904–1906, Bull. No. 3, 1906, Bureau of Educ.

Vol. II, for 1906–1908, Bull. No. 7, 1908, Bureau of Educ.

A biennial digest of all legislation and judicial decisions of importance with reference to state school administration. Published by the Bureau of Education, Washington.

(*f*) Psychology.

Psychological Review, Annual Index to Current Literature. Published annually. Indexes of all current psychological literature. (New York.)

(*g*) Secondary Education.

LEXIS, W. *Reform des Höheren Schulwesens in Preussen.* (Halle, 1902.) Literaturverzeichniss, pp. 424–436.

LOCKE, GEORGE H. *A Bibliography of Secondary education* (a classified index of the School Review, Vols. 1–9). (Chicago, 1903.)

(*h*) Philosophy and Psychology.

BALDWIN'S *Dictionary of Philosophy and Psychology*, Vol. III, Pts. 1 and 2. Contains a very complete bibliographical list of many educational topics, and especially of those relating to educational philosophers. (New York, 1905.)

(*i*) Professional Lists.

The Teachers' Professional Library. A classified list of one hundred titles. U. S. Bureau of Education, Washington, D.C. Bull. No. 8 for 1909. A serviceable selected list for teachers who have not access to large libraries.

(*j*) Physical Education and Physical Training.

MCCURDY, J. H. *A Bibliography of Physical Training*, a very full classified list. (New York, 1905.)

EULER, C. *Encyklopädisches Handbuch des gesamten Turnwesens.* (Vienna, 1896.)

VI. ANNUAL TRADE BIBLIOGRAPHIES AND PUBLISHERS' LISTS CONTAINING, CLASSIFIED OR UNCLASSIFIED, ALL CURRENT BOOKS ON EDUCATION.

A. American.

(1) *Annual American Catalogue:* and *The Publishers' Weekly.* Contains annotations of most books from the various publishers' announcements. (Since 1886.) (New York.)

(2) *Publishers' Weekly*, consisting both of a weekly edition and an annual summary. A reference list of all new publications under author, title, and subject. (Since 1872.) (New York.)

(3) *The Cumulative Book Index.* Both annual and monthly issues. Author, title, and subject catalogue in one alphabet. (Since 1906.) (Wilson, Minn.)

(4) *Catalogue of Copyright Entries*, U. S. Copyright Office, Washington, D.C. Issues weekly and quarterly. The most complete record of current American publications. (Since 1891.)

(5) *Publishers' Trade List Annual.* The publishers' weekly. This gives a list of all books carried on the current trade lists as well as the latest publications. Arranged by publishers' catalogue. (Since 1873.) There is issued each summer a special educational number.

(6) *The Readers' Guide.* Periodical literature. A monthly and annual index to all periodical literature. Educational articles classified and also listed by title. (Since 1900.) (Wilson, Minn.)

(7) *The Book Review Digest.* Monthly. Contains brief annotations or evaluations of leading current book publications. (Since 1904.)

B. English.

(1) *English Catalogue of Books.* Author, title, and subject index under one alphabet. (Since 1837.) (Low, London.)

(2) *The Bookseller.* Monthly. Contains a list of the publications each month. (Since 1858.) (Whitaker, London.)

(3) *Publishers' Circular and Booksellers' Record of British and Foreign Literature.* Contains index of subject, author, and title under one alphabet. (Since 1837.) (Low, London.)

C. French.

(1) LORENZ, O. H. *Catalogue général de la librairie française.* Author and Subject index of French publications from 1840 to 1908. (Volumes issued every five or ten years.)

(2) *Bibliographie française.*

Continuation of above. Gives author, subject, and title classification for five-year periods. (1908.)

(3) *Catalogue mensuel de la librairie française.* The annual volume of the following.

(4) Monthly. *Catalogue mensuel de la librairie française.* A classified list of monthly publications by authors, titles, and subjects.

(5) *Bibliographie de la France.* The weekly journal of the French publications. From 1811 to 1902.

(6) *Memorial de la librairie française.* The complement of the above annual.

(7) *Bibliographie française.* The publishers' catalogue, composed of trade lists of nearly 200 publications.

D. German.

(1) Heinsius, Wilhelm. *Allgemeines Bücher-lexicon.* An alphabetic author catalogue from 1700 to 1892.

(2) Kayser, Christian Gottlob. *Vollständiges Bücher-lexicon.* Similar to above, covering period from 1750 to date. Volumes every four years.

(3) Hinrichs, J. C. *Fünfjahrs-katalog der im deutschen Buchhandel erschienenen Bücher, Zeitschriften, Landkarten,* etc. Similar to above, covering period from 1851 to 1905.

(4) —— *Halbjahrs-katalog der im deutschen Buchhandel erschienenen Bücher, Zeitschriften, Landkarten,* etc. The semi-annual edition of the above. Gives ample author and title lists and an index by subject.

(5) *Wöchentliches Verzeichnis der erschienenen und der vorbereiteten Neuigkeiten des deutschen Buchhandels.* The weekly edition of the above.

E. Belgian.

(1) *Bibliographie nationale, dictionnaire des écrivains belges,* 1830–1880. (Brussels, 1886.)

(2) *Revue bibliographique belge.* A monthly record, with author index to each yearly volume. Since 1889. (Brussels.)

F. Danish.

(1) *Dansk bogfortegnelse.* From 1841 to 1900. Continued by bi-monthly numbers with an annual alphabetic index.

G. Dutch.

(1) Brinkman's *Catalogue der boeken.* From 1850 to 1891. Continued yearly by Brinkman's *Alphabetische lijst van boeken, landkaarten,* and by the monthly *Nederlandsche bibliographie.*

H. Italian.

(1) *Bollettino della pubblicazioni italiane.* A classified monthly record with author index published by the *Biblioteca nazionale centrale di Firenze.*

I. Norwegian.

(1) *Norsk bogfortegnelse.* From 1814 to 1900. Continued by the *Norsk bogfortegnelse* annually.

J. Spanish.

(1) *Bibliografia española.* Since 1900. *Boletín de la librería.* Since 1873. Monthly records.

K. Swedish.

(1) *Svensk bokkatalog.* From 1866 to 1900. (Stockholm, Svenska bokförläggareföreningen.) Continued yearly by the *Årskatalog för svenska bokhandeln.*

VII. General Bibliographical Guide. Kroeger, Alice B. *Guide to the Study and Use of Reference Books.* (Boston, 1908.)

See Encyclopedia; Official State Publications on Education; Periodicals, Educational.

BIDDLE UNIVERSITY, CHARLOTTE, N.C. — An institution for the education of negroes, founded in 1867. Theological, collegiate, industrial, and preparatory departments are maintained. Approximately 6 or 7 points of high school work are required for entrance into the college, which offers classical and scientific courses leading to the degree of B.A. and B.S. Those who complete the 2 years' preparatory course may teach in the public schools of the state. All students in the preparatory school must take work in the industrial department, where a choice is permitted. Carpentry, printing, shoemaking, and tailoring are among the chief kinds of labor provided. There are 13 professors on the faculty.

BILLINGS POLYTECHNIC INSTITUTE, BILLINGS, MONT. — Opened in Sept., 1909, to fit the boys and girls for the practical duties of vocational life in the state; industrial training is to be the leading feature of the institute. Science and liberal arts, engineering, commerce, industrial arts, normal, academic, and music courses are offered. Candidates for admission to the first two of these courses must present a diploma from an accredited high school or its equivalent. Only 2 years of regular college work and engineering will be given for the present. Lewis T. Eaton, M.S., is the educational director and president of the faculty.

BILLINGSLEY, SIR HENRY. — At one time Lord Mayor of London. He entered as a scholar of St. John's College, Cambridge, in 1551, and is said to have studied also at Oxford. Billingsley had been an apprentice and afterwards merchant in London, was Sheriff in 1584, and in 1596 Lord Mayor, and in 1604 Member of Parliament for London. In 1570 he published the first translation into English of Euclid's *Elements.* John Dee, the famous astrologist and mathematician of Queen Elizabeth's reign, contributed notes and a learned preface on mathematics. It has been suggested that John Dee wrote the translation, but there does not seem to be sufficient ground to doubt that Billingsley is the translator, as he claims to be, and has been traditionally esteemed. The title-page is as follows: *The Elements of Geometrie of the most auncient Philosopher Euclide of Megara, Faithfully (now first) translated into the Englishe toung, by H. Billingsley, Citizen of London. Whereunto are annexed certaine Scholies, Annotations, and Inventions of the best Mathematicians, both of time past, and in this our age, with a very fruitful Praeface made by M. J. Dee, specifying the chief Mathematicall Sciences, what they are, and whereunto commodious; where also are disclosed certaine new Secrets Mathematicall and Mechanicall, untill these our daies, greatly missed. Imprinted at London by John Daye.* (Preface dated Feb. 9, 1570.) The book was a translation from the Greek, not merely a translation of the current Latin text of Campanus which was taken from the Arabic version. F. W.

Reference: —

Dictionary of National Biography.

BILLION. — A number name used with two meanings, (1) to indicate a thousand million (or 10^9), and (2) to indicate a million million (or 10^{12}). The former is the usage in the United States and France, the latter in England and on most of the continent of Europe. The word is found in Chuquet's *Triparty* (1484) with the second meaning (10^{12}): "On qui veult le premier point peult signiffier million. Le second point byllion." Trenchant, who wrote at Lyons in 1566, used the word with the first meaning (10^9). It was not a common word in Italy in the sixteenth century, but Cataldi (1602) uses it for 10^9, in the form of *bilioni*, with *duilioni* as a synonym. The Dutch arithmeticians adopted the meaning of 10^{12} at an early date, Vander Schuere (1600) giving the word in the form of *bimillioen*, but in a later edition giving *bimillion* and *billion*. The word does not seem to have been used by German writers before the close of the seventeenth century. The American usage came from the influx of French textbooks early in the nineteenth century. The double meaning offers few practical difficulties, because the word is rarely used in speaking or writing.

D. E. S.

BINAURAL HEARING. — The two ears are used in the recognition of sounds as a single complex organ. Each ear of a normal individual sends to the central nervous system a series of sound sensations, whenever a sound is produced in the presence of such an individual. When these streams of sound sensations reach the central organs, they do not flow together into a single stream of sensory excitation, but are utilized in some complex way to give rise to a single perceptual process. That the two streams of sensory excitation do not flow together is shown by the fact that important phases of our auditory perception depend upon the slight differences that may exist between the intensities and qualities of the two streams of sensory excitation. Thus when a sound is produced on the right side of an individual the right ear receives a somewhat more intense sensory excitation, and the individual tends to turn his eyes in the direction of this more intense stimulus. The result is that the sound is perceived as lying on the right side, although the two streams of sensations are so combined that only one sound is heard. The importance of these differences between the impressions received by the two ears is clearly recognized when a sound is produced in the median plane of the body. A sound in this plane, especially if it is of neutral quality, cannot be located with accuracy, sometimes a position directly in front of the face being confused with a position immediately behind the head. Such confusions of sounds from in front and behind are less likely to arise when the sound has complex tonal quality. The quality of a sound is somewhat different according as it enters the ear from in front or from behind. This is due to the form of the external ear or pinna which directs the sound into the ear. The fact that such slight differences in quality affect the localization of sounds indicates the complexity of the perceptual process. In fact the distinction and relation between sensations and perceptions is nowhere better illustrated than in the complex relation between the two ears.

C. H. J.

See Sensation; Perception; Binocular Vision; Space; and Fusion.

References: —

Pierce, A. H. *Studies in Auditory and Visual Space-Perception.* (New York, 1901.)

Starch. *Psychological Review,* Monograph Supplement No. 29.

BINGHAM, CALEB (1757–1817). — The author of several of the earliest American schoolbooks, was born at Salisbury, Conn., Apr. 15, 1757, and was graduated from Dartmouth College in 1782. For 2 years he was master of Moor's Indian Charity School at Dartmouth, which was under the same management as the college. In 1784 he opened a school for girls in Boston, and 4 years later took charge of one of the reading schools in that city. He was the author of many of the earliest American textbooks, including *Young Ladies' Accidence* (a grammar), *American Preceptor and Columbian Orator* (a reader), *Child's Companion* (a speller), a set of copy slips for teaching penmanship, and *Juvenile Letters,* a collection of familiar epistles between children, calculated to introduce them to the forms of letter writing and English composition. He was one of the original promoters of a public library in Boston. He died at Boston Apr. 6, 1817.

W. S. M.

BINOCULAR VISION. — The images received in the two eyes from a solid object differ slightly from each other. The image in the right eye is somewhat more complete for the right side of the object, while the image in the left eye is somewhat more complete for the left side of the object. The slight differences between the two images do not under ordinary circumstances lead up to a double perception of the objects. There are cases where the differences in form of the two images and the differences in the positions which they occupy on the two retinas may become so unusual that the observer will be confused by the double images. (See Double Images.) If the differences between the two images are of the usual type, they are fused in perception in a single, undivided recognition of a solid object. Sherrington (*Integrative Activity of the Central Nervous System*) has shown experimentally that the two streams of retinal excitations do not flow together in the central nervous system. The process of fusing these two streams of sensory excitations is a complex one wherein the two streams each retain their independence and make a definite contribution to the complex perceptual process. (See FUSION; PERCEPTION.) The problem of the recognition of solidity through the fusion of two retinal images was early recognized as a problem of large psychological importance. Berkeley, in his *Essay Toward a New Theory of Vision*, published in 1709, pointed out the difficulty of giving any simple explanation of perception of solidity and depth. Since the retinal image is on a surface, all three dimensional characteristics of this image must be regarded as reduced if not entirely eliminated. How a solid object can be recognized by a human being through a flat retinal image was the problem which Berkeley discussed. He answered this question by calling attention to the sensations of movement that are always present in visual perception. These sensations of movement do not, however, completely explain the perception of solidity, and the whole problem has been one of the most productive subjects of experimental study.

About a century after Berkeley, Wheatstone, an English physicist, described the stereoscope. The instrument which he described was modified by later students of the problem of binocular vision, and is now known as a popular toy and as a means of instruction. The stereoscope is an instrument which throws into each eye the special image which would naturally come into that eye, if the observer were looking at a solid object. When these two images are presented through the stereoscope, they fuse into a single percept of a solid object.

The development of binocular vision is observed in young children through a study of the movements of their eyes. At the beginning of life the two eyes do not coördinate exactly in their movements. In later life the coördination is more complete, though never absolute. In certain cases the lack of coördination is so marked that vision is not fully developed even at a late period. C. H. J.

References: —

JUDD, C. H. *Laboratory Equipment for Psychological Experiments.*
LE CONTE. *Sight.*
WHEATSTONE. *Philosophical Transactions.* (1829.)

BINOMIAL THEOREM. — A theorem in algebra relating to the powers of an expression of two terms, a binomial. It asserts that

$$(x+a)^n = x^n + nx^{n-1}a + \frac{n(n-1)}{1\cdot 2}x^{n-3}a^3 + \frac{n(n-1)(n-2)}{1\cdot 2\cdot 3}x^{n-3}a^3 + \cdots$$

for all values of n, positive, negative, integral, fractional, or complex. In particular, if $n = 2$, we have

$$(x+a)^2 = x^2 + 2\,xa + a^2,$$

a fact possibly known to the Babylonians, and certainly well known to the Greeks. If $n = 3$ we have

$$(x+a)^3 = x^3 + 3\,x^2a + 3\,xa^2 + a^3,$$

a fact also known to the Greeks.

It will be seen that the coefficients of the various powers of the binomial can be arranged thus: —

0 power	1
1st power	1 1
2d power	1 2 1
3d power	1 3 3 1
4th power	1 4 6 4 1

and so on. The first knowledge of this arrangement of these coefficients is usually attributed to Stifel (*q.v.*), since they appear in his *Arithmetica Integra* of 1544. This is not correct, however, for they appear in triangular array on the title-page of the first edition of Apianus (Bienewitz), *Eyn Newe Vnnd wolgegründte vnderweysung aller Kauffmansz Rechnung*, 1527, and were probably known even earlier. They were afterwards studied in this form by Pascal (*q.v.*), and hence the triangular array has long been known as Pascal's triangle.

The general, or rth, term of the binomial series has for its coefficient

$$\frac{n(n-1)(n-2)\cdots(n-r+1)}{r}.$$

D. E. S.

BIOGRAPHY, USE OF IN INSTRUCTION. — The ancient Greeks made much use of biography as a means of education. Yet the Grecian heroes were too intimately related to the gods to rank fully as mortal men and direct objects of imitation. Odysseus in the *Odyssey* is a good example. The Romans made far more use of biography, presenting actual historical characters. Plutarch's *Lives*, for instance, although written by a Greek, seems to have formed the basis for much of Roman education. At the present time biography plays a very prominent part in the education of youth, both in our own country and abroad. In many of our schools it begins in the lowest grades in the form of stories about Washington, Lincoln, and other eminent men; and while most emphasized in the middle grades of our elementary schools, it receives much attention in our more advanced study, and in literature for adults.

This prominence of biography is probably due, primarily, to the strong interest in personality. So long as the objects about a child, for example, lack human characteristics, they may be wanting in interest; but endow them with personality, and they are loved. The little girl feels affection for her doll to the extent that it is imagined to see, hear, feel, and suffer. If boys and girls were asked to tell how a man might live, if he were placed on an island by himself, the problem might arouse little interest.

But when the situation is personified, as in the story of Robinson Crusoe, it becomes thrilling. Boys and girls regularly weep when Crusoe suffers, and they rejoice when he meets with good fortune. Thus life and feeling are greatly dependent upon the introduction of personality.

Biography possesses other merits, also. With some person as the center of interest, most of the facts narrated must be concrete, since they happen at a particular time and place, or at least are given a particular setting. Thus the great advantage of concreteness is gained.

Further than that, the advantages of good organization are to some extent assured; for the central personality tends to establish a unity among the ideas presented and to secure a close sequence among them. These merits help to explain the popularity of such books as *The Story of Ab* — often used in the study of primitive life in the lower primary school; of *The Seven Little Sisters* — used as an introduction into geography; of *Pilgrim's Progress; Uncle Tom's Cabin; Hiawatha;* and also Carlyle's *Heroes and Hero-Worship*, and Emerson's *Representative Men.*

There are serious limitations to the use of biography, however, that should be noted. In centering attention upon the individual hero, the mass of humanity is in danger of being neglected; and so long as the social point of view is accepted as one of the great aims of instruction in history, this is a vital defect. This objection does not fully apply to the study of the Hebrew race through biography, for such men as Joseph, Moses, and Joshua lived for their people, and the problems of these individuals were the problems of their race. Nor, perhaps, is this objection so serious, if one believes with Carlyle that "the history of what man has accomplished in this world is at bottom the history of the great men who have worked here." (See Carlyle's *Heroes and Hero-Worship*, Lecture 1.) Yet there is little doubt but that most biography so isolates its hero that the individualistic, rather than the social, habit of mind is thereby inculcated.

Furthermore, while biography establishes a certain very desirable unity among a large body of facts, it does not secure the highest kind of organization. While different biographies may constitute individual units, taken together they may not form a unity. An organization based on the growth of great ideas, rather than that of great men, is of a higher kind, although more abstract. In the minds of many students, the history of the world, if presented solely through biographies, would be wanting in many important facts, would lack organization, and would offer a wrong viewpoint.

Owing to such objections the biographical method, both in the United States and in Germany, has been largely confined to the elementary school age, and even there it has been much supplemented by other history. It is at least a question, however, whether it could not be advantageously followed to a greater extent than now prevails, both in religious instruction in our Sunday schools, and in our elementary schools and our high schools. It is certainly superior, both in interest and in organization, to much so-called history that consists only of facts related in chronological order.

F. M. McM.

See History, Methods of Teaching.

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BIOLOGY (βίος, life, and λογία, discoursing). — (1) This word was first proposed independently by Lamarck (*q.v.*) and by Treviranus to designate in a broad way the science of life or of living things in general, its original significance being clearly defined in the title of the chief work of Treviranus, *Biologie, oder Philosophie der lebenden Natur*, published in 1802. With this primary significance the word slowly made its way into general use to denote the study of life phenomena in the widest sense, that is, of the properties of living as opposed to nonliving things. Biology was thus differentiated from the much older term "natural history," employed in the seventeenth century in the sense of "natural science," and later applied in a rather vague way to the "observational sciences," including the history of plants and animals, and also physical geography, geology, and mineralogy. Even as thus limited, biology covers far too wide a field for any single science. Practically, therefore, the word has become a collective term for a large group of biological sciences, such as botany, zoölogy, physiology, and their many subdivisions, each of which deals with a particular aspect of biological phenomena.

> "The term *Biology*, which means exactly what we wish to express, *the Science of Life*, has often been used, and has of late become not uncommon among good writers." — Whewell, *Philosophy of the Inductive Sciences*, 1847.
>
> "That is how it has come about that all clear thinkers and lovers of consistent nomenclature have substituted for the old confusing name of 'Natural History,' which has conveyed so many meanings, the term 'Biology,' which denotes the whole of the sciences which deal with living things, whether they be animals or whether they be plants." — Huxley, *On the Study of Biology*, 1876.

In addition to its original significance, the word "biology" has acquired a number of secondary and more restricted meanings, as follows.

(2) In technical usage it is often employed to denote the "life histories" of plants or animals — *i.e.* their modes of development, habits, and often also their physiological inter-

actions with one another and with their environment. This usage is a survival of an earlier period, especially in entomology, when it was desired to contrast the living external activities of the organism with its mere structural relations and position in the system of classification. By a later extension of meaning it was made to apply not only to the normal organism as a whole, but sometimes also to its constituent parts, and even in some cases to diseases. In this sense we speak of the "biology" of plants, of fishes, of parasites, of cells, of bacteria, of tumors, etc. A distinction is often drawn, accordingly, between "biological" investigation and that which is merely morphological (anatomical, histological, and the like); though in the original broader sense both are alike biological. This use of the word is perhaps most frequent in the continental countries of Europe.

(3) In academic practice the term "biology" is variously and not very consistently employed. It is very often applied, particularly in England and the United States, to general elementary courses of instruction in which both plants and animals are considered in their relation to each other, as illustrative of principles that hold true for living things generally. Such courses are often divided into a botanical and a zoölogical part, the two being so coördinated as to form a coherent whole. This use of the word is largely due to the example of Huxley, who was one of the first to put such courses into effect and to urge their educational value in themselves, as introductory to more specialized courses in zoölogy, botany, or physiology, or as preparatory to the study of medicine. Huxley and Martin's textbook of *Practical Biology*, the first of its kind, was followed by many others of similar type. It set a deep and lasting impress on biological teaching in the English-speaking countries, but its method has been less generally followed elsewhere. Courses of this type in "elementary biology" or "general biology" are now offered in a large number of the educational institutions of England and America. In many schools and academic institutions departments of "biology" are maintained, in which instruction is often given in botany, zoölogy, and physiology as well as in the general elementary subject. In the larger universities, where the biological subjects are distributed among several or many instructors, the tendency has been to maintain separate departments of zoölogy, botany, physiology, anatomy, embryology, paleontology, bacteriology, etc., retaining the name "biology" only for general introductory courses given in one or more of the special departments or by coöperation between them.

There are indications, however, that it may be found desirable in the academic practice of the larger universities to recognize biology as an independent subject. The rapid extension of experimental and analytical methods in biological inquiry is causing zoölogy and botany to converge toward the study of many general problems that are common to both, and in which the traditional line of separation between these sciences is of little or no significance. Such problems are everywhere encountered, for instance, in the study of growth, development, heredity, evolution, and cell phenomena. A large and influential group of biologists are devoting themselves to studies of this type, and in a very few cases (*e.g.* at the University of Cambridge) separate chairs of "biology" have been established for the promulgation of such studies as distinguished from those in botany or zoölogy in the narrower sense. It is not unlikely that this usage will be more widely employed in future. At present, however, the most representative institutions in Germany, England, and the United States have only chairs in the different branches which go to make up the biological studies. E. B. W.

For selected references and more detailed information, see BOTANY, ACADEMIC STATUS OF; PHYSIOLOGY, ACADEMIC STATUS OF; ZOÖLOGY, ACADEMIC STATUS OF.

BIOMETRY. — The science which deals with the methods and results of measurement of animals both in their anatomical parts and in their functional activities. It has been shown by careful measurement that certain species of animals are undergoing changes which would have escaped ordinary observation unsupported by accurate measurement. Again it has been shown that variations can be accurately defined only by securing some standard through careful measurements of a large number of specimens. A deviation in size from the average of the species may be significant in explaining the preservation or destruction of a given animal in the struggle for existence. Such a deviation can very frequently be detected only through accurate measurements. Measurements of the type which have been made on animals and their functions can be carried on statistically for many of the activities of the schoolroom. (See STATISTICS.) Individual variations (*q.v.*) appear among children, and are of importance in determining educational activities. These can be measured by methods similar to those employed in general biometry.

C. H. J.

BIRCH. — See PUNISHMENT.

BIRD DAY. — See SPECIAL DAYS.

BIRD STUDY. — See SPECIAL DAYS; HUMANE EDUCATION.

BIRKBECK, GEORGE, M.D. (1776–1841). — Founder of Mechanics' Institutions; born at Settle, Yorkshire (1776); son of a merchant and banker; studied medicine at Edinburgh, where among his fellow students were Brougham (*q.v.*) and Jeffrey. In 1799 Birkbeck was appointed Professor of Natural Philosophy and Chemistry at an educational institution in Glasgow called Anderson's University, which had been founded by Dr. John Anderson (*q.v.*), Professor of Natural Philosophy in the University of Glasgow. Anderson, for some years before his death occurred in 1796, had been in the habit of giving a course of lectures on experimental physics, to which some workingmen, among others, were invited. When Birkbeck began his first course of lectures at Anderson's University, he found it necessary to make a good deal of apparatus, and as no scientific instrument maker resided at that time in the city, he was obliged to apply to the workshops which were best able to meet his needs. In this way he made the acquaintance of a number of Glasgow artisans. He found them so anxious to acquire knowledge and so full of intelligence, that he resolved to give a course of experimental lectures upon mechanics, " solely for persons engaged in the practical exercise of the mechanical arts, men whose situation in early life has precluded the possibility of acquiring even the smallest portion of scientific knowledge." His lectures to workingmen became very popular, and were continued until his removal from Glasgow to London in 1804. During the early years of his residence in London, Birkbeck was absorbed in his duties as a physician, but the development of his Glasgow mechanics' class in 1823 into the Glasgow Mechanics' Institution led him once more to occupy himself with the questions of popular education. He took the lead in the establishment of a Mechanics' Institution for London, lent a large sum for the building of a lecture room, and was elected the first president of the society. In this work he was associated with Lord Brougham. Throughout the rest of his life, Birkbeck was the leading figure in the movement for the extension of popular scientific instruction for workingmen. He was also one of the founders of University College, London (1827), and vigorously advocated the repeal of the taxes on newspapers (1835–1836). M. E. S.

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BIRMINGHAM SEMINARY, BIRMINGHAM, ALA. — Founded in 1897 for the education of girls and young women. Primary, academic, collegiate, and fine arts departments are maintained. The college courses are based on about 2 years of high school work. Degrees are conferred. The faculty consists of 14 instructors.

BIRMINGHAM, UNIVERSITY OF. — Founded in 1870 as the Josiah Mason's College for the Study of Practical Science, changed in 1881 to the Mason Science College, and in 1897 to the Mason University College. The institution was established to promote the practical mechanical and artistic requirements of the Midlands of England. In 1900 Mason University College was merged by the Birmingham University Act in the university, which had received a Royal Charter in the same year. At that time, by the public-spirited efforts of its citizens who raised the endowments, the future progress of the university was assured. Like all the northern universities of England, its success depends on its adaptation to local needs. Since receiving the Royal Charter, considerable additions have been made to the buildings and equipments, which were opened in 1909. The university maintains faculties of science, arts, medicine, and commerce, in all of which degrees are given. The university has power to inspect schools and hold school-leaving examinations which it may accept in lieu of the Matriculation Examination. Many local authorities maintain scholarships at the university and give financial support. The teaching staff in 1908–1909 consisted of 113 members, and the enrollment of students was 910. The Right Hon. Joseph Chamberlain, to whose efforts the university was largely due, is the first Chancellor.

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BISCOP, BENEDICT (628–689). — Biscop may with sound reason be called the Father of English Culture. He was of noble stock (probably bearing the patronymic "Baducing"), a theyn of Oswy, King of Northumbria, the seventh Bretwalda. Soon after the year 650 he made his first visit to Rome. On his way he stopped at Canterbury, and was entertained by the Archbishop Honorius, the companion and successor of Augustine. There he met Wilfrid, afterwards the famous Bishop of York, and the two traveled Romeward together. Wilfrid stopped for a time at Lyons with Bishop Dalfinus, but " Biscop hastened on to Rome." Bede tells that Biscop visited Rome in all five times, and each time returned with a great store of books and pictures. We know that he was in Rome in 668, because in that year, at the request of Pope Vitalian, he accompanied Theodore to Britain as guide and interpreter, and was placed in charge of the monastery of St. Peter and Paul (St. Augustine's) at Canterbury until the Abbot Adrian arrived. In 674 he founded the famous Northumbrian Monastery of Wearmouth. After this work was accomplished he went again to Rome, this time with his fellow worker Ceolfrid (who succeeded him as Abbot of Jarrow). Bede tells us (*E. H.* IV, 18) with respect to the visit that he had been there " several times before," so presumably he had visited Rome once at least between the visit of

650 and that of 668. This particular visit was to find a teacher in music and sound doctrine, and Pope Agatho sent back with him John, Abbot of St. Martin's at Rome, that he might teach in his monastery the system of singing throughout the year, as it was practiced at St. Peter's in Rome. John's educational work is recorded in the same chapter (*E. H.* IV, 18). He taught "the singers in the said monastery the order and manner of singing and reading aloud." He also committed to writing "all that was requisite throughout the whole course of the year for the celebration of festivals." His fame as a teacher extended through the North: "such as had skill in singing resorted from almost all the monasteries of the same province to hear him, and many invited him to teach in other places." He examined into the condition of the faith in England, and reported it sound. But John died on his homeward journey, and was buried in St. Martin's Church at Tours. He may have been one of the teachers of the boy Bede, who tells us that he (Bede) was, in the year 680, "given by the care of kinsmen, at seven years of age, to be educated by the most renowned abbot Benedict, and afterwards by Ceolfrid" (*E. H.* V, 24). The next year (681) Benedict founded the Monastery of Jarrow (which forms the second part of the twin monastery presided over by Benedict), and appointed Ceolfrid as Abbot. Bede passed to Jarrow with Ceolfrid, and spent the rest of his life there. Of Benedict's fourth journey to Rome we are told, *eum innumerabilem librorum omnis generis copiam apportasse.* He also brought books from Vienne. Miss Sellars tells us (in her edition of the *Ecclesiastical History*, p. 257) that he enriched his twin monasteries, "with furniture, vestments, relics, pictures, and a library of valuable books which he brought from the Continent. The rule which he framed for his monasteries was Benedictine, compiled from seventeen different monasteries which he had visited." His fifth journey to Rome must have been between 681 and 685, when he made a sixth visit to the Continent, "almost entirely devoted to the collection of books, including classical books" (Sandys' *History of Classical Scholarship*, Vol. I, 2d ed., p. 468). In 688 he was succeeded at Wearmouth by Ceolfrid, who ruled over both monasteries and added to Benedict's library. In the *Codex Amiatinus* of the Latin Bible, written at Wearmouth or Jarrow, and now at Florence, we have extant evidence of the culture introduced into Northern England by Biscop and Ceolfrid. Moreover, some remarkable and beautiful vestiges of both abbeys remain as parts of the parish churches of North Wearmouth and Jarrow. Benedict Biscop died on Jan. 10, 689, while his fellow worker Ceolfrid survived till 716, in which year he resigned his office and died at Langres on his way to Rome. These workers are definite links in the educational line connecting Augustine (*q.v.*) through Theodore and Adrian with Bede (*q.v.*), Egbert of York, and Alcuin (*q.v.*). J. E. G. de M.

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DRANE, A. T. *Christian Schools.* (London, 1881.)

BISHOP, NATHAN (1808–1880). — Schoolman, educated at Hamilton Academy and at Brown University; tutor in Brown University (1837–1838); superintendent of the schools of Providence, the first city superintendency established in the United States, from 1838 to 1854, and first superintendent of the schools of Boston (1854–1855). W. S. M.

BISHOP, ROBERT HAMILTON (1777–1855). — Educator and textbook writer, was educated in the schools of Scotland and at the University of Edinburgh; he was professor at the Transylvania University from 1803 to 1824; at Miami University from 1824 to 1845, and president of Farmers College, near Cincinnati, from 1845 to 1855; author of a series of textbooks in logic, civics, etc. W. S. M.

BISHOPS' COLLEGE, UNIVERSITY OF, LENNOXVILLE, QUEBEC. — A coeducational institution founded in 1845 and administered by a Corporation consisting of the bishops of the Anglican Church of the Province of Quebec and the trustees and college council appointed by them. Preparatory, college, and theological courses are offered. For the degrees 3 years' residence is required. There is a faculty of 3 professors and 5 lecturers.

BISHOPS' SCHOOLS. — The importance of the part played by bishops in the history of modern education, since Christianity became the established religion of the Roman Empire, can hardly be exaggerated. Whether on the whole that part has been for the advancement of education or the reverse may perhaps be questioned. Indeed, in one view the history of education may be considered as the history of the elimination of episcopal authority from a sphere with which it has no proper concern. But of the importance of the influence of the bishop on the school there can be no question. When the history of modern schools begins, the bishops were the only, and they remained for many centuries by themselves or their officials the chief, educators and directors of educators, and their schools the chief seats of education throughout Western Europe. At what exact date the public schools of grammar and of rhetoric, maintained either by the central authority of the Emperor out of the fiscus, or by the local authority, the municipium, out of local funds, died out and were superseded by the episcopal schools it is hard to say with certainty. In Gaul the public schools still flourished in the fourth century, when Ausonius gives a poetical account of the school of Bordeaux, while St. Sidonius Apollinaris, consul and then bishop, speaks of the schools of Vienne, Périgueux, and Lyons as late as 483.

In Italy it is certain that they flourished in the first half of the sixth century, for Ennodius, a native of Gaul, Bishop of Ticinum (Pavia) from 513 to 521, has preserved 28 speeches composed for the schools of rhetoric at Pavia and for Milan school when a nephew was admitted to it. Venantius Fortunatus, author of a poetical life of St. Martin of Tours in 570, a native of Italy born at Treviso, tells how he had in his youth licked up the small stream of the water of grammar and taken a slight drink out of the deep pools of rhetoric. But in France public schools had apparently disappeared by the sixth century. For Gregory of Tours himself is recorded to have been brought up at Clermont, not in the public school, but by bishops Gallus and Avitus.

The identification of the episcopal office with that of the schoolmaster was not effected without opposition. Pope Gregory the Great (*Ep.* XI, 54), who had himself been in 595 so " well-grounded in grammar, logic, and rhetoric that no one in Rome was even second to him " (Greg. *Tur. Hist. Franc.* X, i), rates Desiderius Bishop of Vienne, because, " as we cannot relate without shame it has come to our knowledge that your brotherhood teaches grammar to certain persons, which we take all the worse as it converts what we formerly said in your favour to lamentation and woe, since the praise of Christ cannot lie in one mouth with the praise of Jupiter. Consider yourself what a crime it is for bishops to recite what would be improper for religiously-minded laymen." This letter is doubly interesting, as it shows not only that episcopal education was an innovation and that things were in a transitional stage, passing from the lay, and indeed heathen, public school to the episcopal school, but also that the episcopal school was a grammar school in which the " heathen " classics, and we may infer Vergil's *Eclogues,—A Jove principium Musae, Jovis omnia plena,—* still formed the principal part of the curriculum. Gregory the Great, indeed, wished to kick down the ladder by which he had risen. Though he had been Nuncio at Constantinople for 6 years, he glories that he knows no Greek and has written nothing in Greek; and says he despises the art of speaking taught by the rhetoric school masters. He equally contemns the art of grammar, and does not try to avoid the confusion of cases, " because I am strongly of opinion that it is an indignity that the words of the oracle of Heaven should be restrained by the rules of Donatus" (*q.v.*), the great grammarian who was St. Jerome's schoolmaster, whose grammar reigned without a rival in the schools till 1540. Isidore of Seville, some 30 years Gregory's junior, who had to fight for the Catholic faith with an Arian king, though he forbade the monks to read the classics, thought grammar schools necessary for clerks. " Better grammar than heresy," and he himself taught and produced his *Origines*, which was the chief encyclopedia of the Middle Ages. Gregory himself, in the very letter to Desiderius above mentioned, commanded the missionary monk Augustine (*q.v.*) on his way to England to abandon his monkish life and live with his clerks as other bishops did. He had to teach the English converts Latin, so that they might understand the very elements of their new creed and be able to read its sacred books. It did not apparently occur to any one to do what the modern missionary does and translate the sacred books into the barbarian dialect. For its very words, though themselves only a translation, had acquired a superstitious sanctity. Hence, Augustine must have set up a school soon after his arrival in England. For some 30 years later, in 631, when East Anglia was Christianized under King Sigebert, who had been baptized while in exile in Gaul, he, " wishing to imitate what he had seen well done in Gaul, founded a grammar school (*scholam in qua pueri litteris erudirentur*) with the assistance of Bishop Felix, whom he had received from Kent, also provided them with ushers and masters after the manner of Canterbury " (*more Cantuariorum*) (Bede, *Eccl.* IX, iii, 18). This is proof positive that there was such a school at Canterbury, of already established reputation such that Felix, though a Burgundian who had been some three or four years only in Canterbury, thought it enough to staff his school thence and not from France itself. This passage, while it demonstrates the existence of the episcopal school at Canterbury and the foundation of one at Felix's see of Dunwich, also conveniently annihilates the thesis of Dr. Paul Roger (*L'Enseignement d'Ausone et Alcuin*, 1905), who attempts to show that in France at this time there was no real learning, and only monastic schools where the inmates were taught to hobble through their grammar so as to read the psalms they spent their time in singing. Clerval has shown (*Les Écoles de Chartres au Moyen-Age*, 1895) that St. Bethaire, who was Bishop of Chartres (*c.* 594–614), had been made *doctor divinarum litterarum et magister totius civitatis* when a clerk under Bishop Peppol, whom he succeeded in the bishopric. The life of St. Leufroy (ASS. 21 June, IV, 04) pictures him going to school first at St. Évreux, near Chartres, then at Rouen.

In England, we find in 635 the first Bishop of York, Paulinus, had introduced a song school (which it can hardly be doubted was in addition to a grammar school) and James the Deacon, the teacher of this school, stayed when Paulinus fled from a heathen reaction. When Christianity was restored, James " became master of ecclesiastical singing to many, after the fashion of Rome and Canterbury." At Rome, the song school (*schola cantorum*) had been instituted by

Pope Gregory himself. So that besides its grammar school, Canterbury had its song school, and these two schools are found in every secular cathedral down to the Reformation. Canterbury School has hitherto been wrongly imputed to the Greek archbishop, Theodore, who came to Canterbury in 669. His learning and that of his pupils have been celebrated by Bede, who says that even to his day (735) some survived, " who knew Latin and Greek as well as their own language in which they were born." Theodore went all over England preaching and teaching. His pupil, Tobias, who died Bishop of Rochester in 726, is especially said to know not only Latin and Greek but to have " a knowledge of literature ecclesiastical and general." The celebrated poem of Alcuin *On the Bishops and Saints of the Church of York*, written about 780, says that Archbishop Egbert (*q.v.*), who has often, but wrongly, been claimed as Bede's pupil and Alcuin's own master, was an eminent teacher (*egregius doctor*) there. Of his successor, Ethelbert, or Albert (*q.v.*), Alcuin records how he was himself educated in York Minster and was made "advocate of the clergy and master in the city of York." Here he taught everything, the whole seven liberal arts, grammar, rhetoric, logic, music, astronomy, geometry, arithmetic, especially how to find Easter, — the order is probably due to the exigencies of meter rather than design, — and law and theology to boot. When he became archbishop, he did not cease to teach, " being made both a wise teacher and a pious priest, increasing the sense of his pupils and the morals of his clergy." But at Albert's death, the offices of bishop and teacher were separated. Eanbald became archbishop, " but to his other son," Alcuin himself, " he gave the dearest treasure of his books. To the one the rule of the church, its treasures, its lands, its funds, to the other, the search for wisdom, the school, the master's chair and the library." When Eanbald II, the successor of Alcuin's fellow pupil, was archbishop, Alcuin wrote to him to suggest a further division of labor, and the establishment of separate masters for singing and writing.

From the end of the eighth century, then, here, as was also the case in France, the bishop himself ceased to teach, at all events in the secular cathedrals. Where, as happened in England only (except for a few sporadic cases abroad in later centuries), the bishop's council of clerks, the secular canons, was turned out to make way for monks, it would appear that the bishop himself continued to teach. Thus Aldhelm of Malmesbury (*q.v.*) is said to have been taught by Bishop Elphege at Winchester. But the monastic lives must be received with a great deal of caution. It is certain, however, that in the secular cathedrals by the eleventh century, the duty, not only of teaching, but of supervising schools and appointing masters, had been devolved on the schoolmaster, or, as he came to be called, chancellor of the church, and the cathedral schools (*q.v.*) became more or less independent of the bishops. In the monastic cathedrals the bishop retained the power in his own hands, the monks, as unlearned persons, (*idiotae*), not being considered capable apparently of exercising the duty properly, and the masters were always secular clerks. Thus at Winchester we find the bishop in 1155 being appealed from on a decision as to the right to the school between two of his clerks; at Canterbury we find a rescript of Archbishop Peckham in 1289 as to the powers of the master to determine cases between his scholars and outsiders; and in 1295 we find the same archbishop appointing a master of the school of the city of Norwich on behalf of the bishop, when that see was vacant. A whole series of appointments of the grammar school masters of Canterbury made by the archbishop are preserved in the archiepiscopal registers at Lambeth, ranging from one of Mar. 11, 1310, to the end of the fifteenth century, when the prior writes to tell his " gude faderhood " that he has found a master who had taught grammar at Winchester and St. Anthony's, London, for " your grammar scole at Caunterbury." At Worcester in 1312 the bishop appoints a master to the school of that city, " whether the appointment belongs to my episcopal or my archidiaconal authority. " Similar appointments are found at Ely and Carlisle. At the Reformation these schools were made part of the new cathedral foundations, and passed from the bishops to the new chapters.

But the Reformation brought the bishops again into direct connection with all the schools. Henry VIII, Queen Mary, and Queen Elizabeth, each in turn, though from opposite points of view, directed the bishops to examine all schoolmasters, and, finding them suspect, to remove them. The canons of the Church and the orders of the Privy Council on successive occasions in 1559, 1580, and 1603 forbade any schoolmaster to teach without the license of the bishop, while it was made the duty of the bishop, duly carried out at every visitation, to inquire whether any schoolmaster of suspected religion or tenets licensed to teach by him, doth teach in any public or private place within his diocese. This extended even to elementary schools. After the commonwealth successive decisions of the Courts of Law, founded on bad history and law but good policy, gradually restricted the bishop's jurisdiction to grammar or classical schools. It was not till the Endowed Schools Act, 1869, directed the commissioners under that act, afterwards the Charity Commissioners, to insert in all schemes a clause abolishing the jurisdiction of the ordinary, that the bishops ceased to have the right to interfere with secondary schools. The right still prevails theoretically in those schools which have not yet been made the subject of schemes under the act.

Since, however, the powers under the act were in 1902 transferred to the Board of Education, and that Board was enabled to make grants of public money to all schools, and they have made it a condition of the grant that no denominational restrictions shall be imposed, the schools have become free from even this shadowy right of episcopal government.

A. F. L.

See Church Schools; Cloister Schools; Cathedral Schools; Reformation and Education; etc.

BLACK AND WHITE WORK. — A term usually applied to illustrations, and refers to sketches and drawings made in ink, charcoal, pencil, or black and white oil paint. It is significant in school work usually in connection with drawing and design (*qq.v.*).

BLACK DEATH AND ENGLISH EDUCATION, THE. — The Black Death of 1348–1349 — known in chronicles as the "Great Death" by reason of the fearful destruction that it wrought among man and beast, and also called the "First Death" because it was the first of a series of outbreaks that lasted into the sixteenth century and possibly only ended with the outbreak of 1665 — was a turning point in the history of English education. Indeed, the economic changes that it brought about affected the whole course of English history. Society was disintegrated, and the clergy who undertook the bulk of the educational work were either destroyed or disorganized. We have direct evidence as to this. In a letter from Pope Clement V, to Archbishop Zouche of York, dated from Avignon Oct. 12, 1349, it is noted that "in consequence of the Plague there are not enough priests to administer the sacraments" in the province of York, and the archbishop is directed to have additional ordinations to supply the need (*Historical Papers and Letters from the Northern Registers*, Rolls ed., p. 401). By a statute of 1362 (36 Edw. III, c. 8) the Commons petitioned for relief since the "priests be become very scant after the pestilence to the great grievance and oppression of the people," and the King promised a remedy by fixing the wages of the parish priests. In the south it was as bad. In the Constitution of 1362, issued by Simon Islip, Archbishop of Canterbury, we read that "the priests that now are, not considering that they have escaped the danger of the pestilence by divine providence, not for their own merits, but that they might exercise the ministry committed to them . . . have no regard to the cure of souls . . . so that . . . many churches, prebends, and chapels of our and your diocese, and of the whole province, will be destitute of priests to serve them." And again in the *Prologue to Piers Plowman* (*Passus Primus*, ll. 81–84) we read: —

"Persones and parish priestes pleynede to the bishop
That here parishenes weren pore sith the pestilence tyme,
To have a licence and leve at London to dwell
And singe there for simonye while silver is so sweet."

We must now notice another phenomenon arising from the Great Death, and will then be in a position to estimate the influence of the plague on education. This phenomenon is the almost total disappearance of the Anglo-Norman tongue. It is true that the tongue was weakening before 1348. In a late thirteenth-century or early fourteenth Oxford University Statute it is directed that boys shall be taught to construe in French as well as in English in order that the former tongue might not be forgotten (see *Munimenta Academica Oxon.*, pp. LXX, 438). But on the other hand we know from Higden's *Polychronicon* (Vol. II, pp. 159–160) that about the year 1327 "children in scole agenst the usage and manere of alle othere nacions beeth compelled for to leve hire owne langage, and for to construe hir lessouns and here thyngs in Frensche, and so they haueth seth the Normans come first in to Engelond." That was the rule twenty years before the Great Death. In 1362, twelve years after the Great Death, we find that pleas were ordered (36 Edw. III, c. 15) to be pleaded in the English tongue, defended, answered, debated, and judged in English, and enrolled in Latin. The same statute tells us the reason by referring to "the French tongue, which is much unknowen in the said realm." As we shall see directly, by 1385 French was generally excluded from English schools. The sudden birth of English as an educational and literary fact after the Great Death proves clearly enough that the schoolmasters of the country had ceased to be French. We know, in fact, that the very numerous vacancies in churches caused by the Black Death were not filled up by the alien priories in 1349–1350, because of the war with France. The temporalities of the priories were in the hands of the King, and in a great number of cases (see *Patent Rolls* for these years) we find appointments by the King such as the following: "Translation of John de Clone to the Church of Bisshopeshowe in the diocese of Salisbury, in the King's gift by reason of the Priory of Farleye being in his hands on account of the war with France." Moreover, the sudden rush for orders that followed the letter of Pope Clement V of 1350 was made not by foreigners but by Englishmen, and a very mixed company of Englishmen, too. The chronicler tells us that the vacancies caused by the mortality and flight of priests were filled up by men of all kinds, fit and unfit, ignorant and learned, including many who had lost their wives through the pestilence. This was a new English influence in education, and it is therefore not with any great surprise that we read what John de Trevisa in his edition (concluded in 1387) of Higden's *Polychronicon* has to say on the subject of the exclusion of French from the schools.

After the passage above, Higden dwells on the use of French in schools and good society in the year 1327. Trevisa (writing in English, be it noted) adds the following comment: "This manere was moche i-used to for firste deth, and is sith-the sumdel i-chaunged; for John (Sir Johan Cornwaile,) a maister of grammer, chaunged the lore in gramer scole and construccioun of Frensche in to Englische; and Richard Pencriche lerned the manere techynge of hym and of othere men of Pencrich; so that now, the yere of our Lorde, a thowsand thre hundred and foure score and fyve, and of the secounde Richard after the Conquest nyne, in alle the gramere scoles of Engelond, children leveth Frensche and construeth and lerneth an Englische, and haueth thereby auauntage in oon side and disauauntage in another side; here auauntage is, that they lerneth her gramer in lasse tyme than children were i-woned to doo; disauauntage is that now children of gramer scole conneth na more Frensche than can hir lift heele, and that is harme for them and they schulle passe the see and trauaille in straunge landes and in many other places. Also gentil men haueth now moche i-left for to teche here children Frensche." Here we have a document of the first importance in the history of English education. It tells us definitely that French was used in the schools up to the date of the Great Death, and that within 12 years the use was abolished from "all the grammar schools of England." Such a sudden change can only have arisen by the death or departure of the class who had always taught in French. The educational system may have been affected by the fact that the pestilence particularly attacked old men and boys (*Chronicon a Monacho Sancti Albani*, Rolls ed., p. 49). We are especially told that the disease selected males (*idem.*, p. 50). But what is more important to note is that the new departure in education was really a Wiclifite movement. Mr. W. H. Stevenson appears to have identified the priest John Cornwaile, the author of the movement, as a teacher of grammar at Oxford in connection with Merton College in 1347. Now it also appears that Cornwaile's pupil Richard Pencriche was a student at Merton in 1367, a contemporary of Wiclif and also of John de Trevisa, then at Exeter College, who tells the story of the change. It is pretty clear that Trevisa obtained his information direct from the old fellow students. But from Trevisa's narrative it is not easy to see how a change in one school, the school of a Collegiate Church in Staffordshire, could so rapidly have effected the change throughout the country. But when we realize that the whole movement was an Oxford movement, springing from Merton and related to Wiclif, it can be understood at once. The rapidity with which the Wiclif movement spread is in itself astonishing. A statute of 1382 (5 Ric. II, c. 5) tells us that the Wiclif preachers "in certain habits under dissimulation of great holiness" preached daily in churches, churchyards, fairs and markets," and drew vast crowds. They preached in English, their Bible was in English, their action, until 1382, was perfectly legal. From the point of view of the history of education it is necessary to couple their work with the influence of the Black Death in accounting for the total disappearance of the French tongue from England. Nor must we forget the French war and the import duties and tolls which (Patent Rolls 1348-50, p. 488) in 1350 kept foreign merchants out of Oxford and, presumably, out of other places. The expulsion of the Alien Priories in 1415 gave the last blow to the French tongue. That the Wiclif movement was definitely related to the movement that ejected French from the schools we can scarcely doubt, when we see that the originators of the latter movement were contemporaries of Wiclif at Merton. But apart from this the rapid change of teaching in the grammar schools must also be attributed to the university origin. The grammar schools in the fourteenth century were closely related to the universities, and this fact combined with the Wiclif movement and the Great Death is responsible for the extraordinary rapidity of the change and the Great Plague is for this reason a turning point in English education.

J. E. G. de M.

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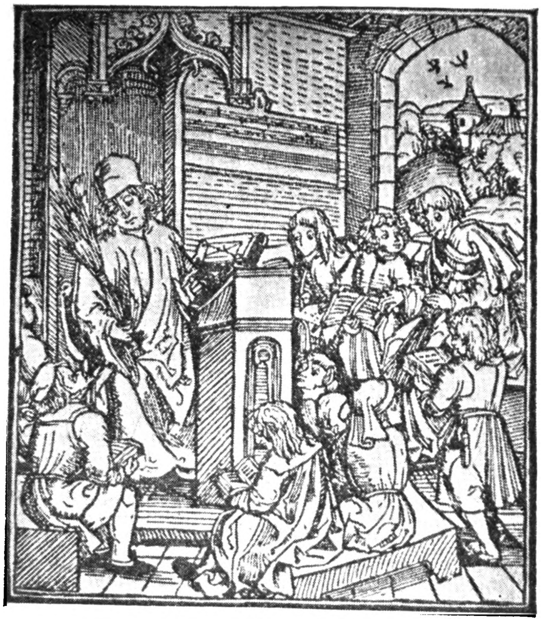
BLACKBOARDS. — Historical Sketch. — Blackboards were evidently a modification of the waxen tablets of the Romans and the hornbook (*q.v.*) of the Middle Ages. Probably the earliest evidence of this character is found in a manuscript of Sacrobosco in 13th century where a child is represented as holding up a large blackboard in the form of a hornbook having figures written upon it. Numerous cuts in early printed books exhibit boards hung on the wall of a schoolroom, having music notes, catechism, or figures written upon them. These are usually modified hornbooks in shape, hung loosely by an eye in the handle, but being very much larger than any board which could be held conveniently in the hand. The earliest of these definitely located is in the title-page illustration of a schoolbook (*Compendium octo partium orationum*) published in Basel in 1499. (Michael Furtes.) A similar one dated 1500 from Nuremberg is reproduced in the accompanying illustration. The Nuremberg school-regulation of about this time was to the following effect: —

"For the 'intermediate' boy in Nuremberg there should be written 'towards night,' that is in the evening before leaving school, 'with chalk on the board,' — which board was then found in every schoolroom — 'in Latin, a Latin verse or a maxim from a complete oration or from the proverbs of Solomon, Cato or others like them, and with it two German verses, rhymed or unrhymed, according to the Latin meaning' — the German translation was thus in verses, that they might better stick in the memory." (See *Monographien zur deutschen Kulturgeschichte*, Band IX, *Der Lehrer in der deutschen Vergangenheit* p. 53.)



In the first edition of Comenius' *Orbis Pictus*, published in 1658, he shows a schoolroom, on the wall of which there hangs a blackboard, and in the tabulated description of the things in the room, he says *Quaedam praescribuntur illis Creta in Tabella.* (Certain things are written down before them with chalk on a little board.) Hoole translates *Tabella* by the English word "table" and this in spite of the fact that the figure 6 designating this object is placed alongside of the board hanging on the wall. Besides, the primary meaning of this word is not table, but little board or plank.

From this it is entirely safe to say that the blackboard was, if not a customary thing, not an unusual thing to be found in the schoolroom in the days of Comenius. We have further evidence in Brinsley's *Ludus Literarius*, published in 1660.

When we come to the educational literature of our own country, it is exceedingly difficult to find much information about the kinds of blackboards used in the schools prior to 1820. About this time, if we may rely on Joseph B. Felt in his *Annals of Salem* (see p. 469), Vol. I, "blackboards were used in our common schools, for arithmetical calculations. Manuscripts of sums, set for pupils by their masters, which had continued for a long period, began to be laid aside." Blackboards were introduced into the Military Academy at West Point in 1817 by Mr. Claude Crozel, a graduate of the Polytechnic School of Paris. A blackboard was introduced into Bowdoin College by Instructor, afterward Professor, Smyth in 1824. The account runs: "That novelty, let me say, made a sensation. When he had tested the experiment in the Sophomore algebra, and with great success, a considerable portion of the Juniors requested the privilege of reviewing the algebra under the new method at an extra hour, — a wonder in college experience; and that blackboard experiment, I am sure, led to his appointment as assistant professor of mathematics a year later. . . . The blackboard caused an important change in the manner of teaching generally, but especially in mathematical branches. In arithmetic, a Freshman study, and algebra, to which we were introduced at the opening of the Sophomore year, each student had his slate, and when he finished his work, he took the vacant chair next the teacher's and underwent examination of process or principle involved. In geometry we kept a manuscript in which we drew figures, and demonstrated from them." (*History of Bowdoin College*, by Cleveland and Packard, pp. 90–91.)

In the *Report of the School Committee* for Boston in 1823 (p. 54), the following reference to the use of a blackboard is made: "In learning Geometry the diagrams of Euclid are taken off, first on paper, with figures instead of letters, that nothing may be committed to memory without being understood. When they have been demonstrated from the paper, they are afterward drawn by the pupil on the blackboard, with figures; when the proposition is demonstrated without a book, or any aid to the memory whatever." In William A. Alcott's famous prize essay presented to the *American Institute of Instruction* in August, 1831, he gives a floor plan of an ideal school, with its furniture in place. In this are shown two large blackboards on movable frames, and they are placed immediately behind the rear row of seats, and serve the double purpose of a blackboard and a screen from the front door. In 1839 Dr. Henry Barnard wrote in his *First Annual Report to the School Commissioners of Connecticut.* "Blackboards are not uncommon, but are but little resorted to by the teacher."

Construction and Hygiene of. — When we come to a consideration of the construction of blackboards, we find that up to pretty well toward the middle of last century they were almost invariably of wood painted or stained black, and were generally on movable frames or so fashioned as to be hung on the walls where need dictated.

If easy vision were the only matter for consideration, blackboards would be condemned outright, and in their places would be substituted some form of unglazed white or cream-colored surface, upon which black crayons would be used; for investigation has made it clear that a black letter on a white background is much more easily read at a distance than white letters upon a black surface. Cohn, in his *Hygiene of the Eye*, quotes Horner with approval, who says: " The hygiene of the eye demands the banishment of slates and blackboards from our schools and the use of pen and ink in their place. Compliance with this demand will do something to diminish the danger of short sight, a danger which becomes more and more menacing to each successive generation." There is now no question in our country concerning the use of slates. They have gone from almost all the schools, even in the mountain regions of the South and West. Cheap clean paper and lead pencils have displaced the slate, but we have the blackboard still with us, and undoubtedly will continue to have. The slate disappeared not chiefly because of eyestrain, but because it was so dirty, unhandy, and noisy. While there can be no doubt that for the sake of acuity of vision words written in black on a white surface have the advantage, it must not be forgotten that the large white surface exposed to the eye is likely to stimulate the retina unduly over a large field or else to fatigue the ciliary muscles of the eye in its efforts to accommodate to the field of vision.

Taking it all in all, it may be laid down that the blackboard, when made of proper material, properly colored, properly placed with reference to light and the convenience of the pupils, and when used in a legitimate way, does not offer a serious menace to the eyes of our pupils.

The proper material for blackboards. — (*a*) Reasonably good blackboards can be made by thoroughly mixing with cement plaster a dull black coloring matter very slightly tinged with dark green, and then spreading the mixture on the laths carefully so as to get a level, even surface. In constructing this form of blackboard, which is one of the cheapest, the best of cement ought to be used, and so thoroughly mixed with the coloring matter that it would make the color uniform and even. It is best also to use metal lath fastened firmly on a solid sheathing of lumber.

Before applying the cement the sheathing should be kept slightly damp for at least half a day in order that the dampness from the wet plaster would not cause a sudden expansion of the boards, and hence have a tendency to crack the plaster before it is thoroughly set. By having the boards of the sheathing slightly expanded before the plaster is applied, the shrinkage comes slowly, and tends to prevent the premature setting of the plaster, and also causes the plaster to cling to the wood as well as to the metal lath. Blackboards so constructed are more solid, firmer, and less noisy than when laid on wooden lath. Care will be needed, however, to make sure that the surface of the board will be neither too smooth nor too rough.

The advantages of this kind of a blackboard are its comparative cheapness, its opportunity for proper coloring, its ready adjustment to the building, and the readiness with which the material may be obtained. The disadvantages are, the absorption of moisture from within or without, the tendency to become oily from contact with the hands of the children, the liability to crack or chip, the difficulty of getting a surface which will take the chalk readily, evenly, but not wastefully, and the more or less inevitable alteration in the color of the board through washings and uneven use.

(*b*) Recent years have seen the rapid development of so-called hyloplate blackboards, and these, when thoroughly made, serve their purpose for a time satisfactorily. In general this style of blackboard is constructed of several layers of heavy specially prepared paper so fastened and pressed together as to make a solid " board " which can be cut to suit the needs and requirements of any schoolroom. The outside layers, or, in some cases, to a greater depth, are colored thoroughly and evenly to suit requirements. The advantages of this style of blackboards are these: there are no joints, the surface is even, they are easily adjusted, they are temporarily inexpensive, are not easily broken, and take the chalk fairly well. The disadvantages in general are these: they are likely to absorb moisture from the walls, especially if placed close to brick walls, and therefore to buckle or warp and draw away in places from the backing; they often wear unevenly; they are most frequently noisy; they absorb oil and dirt from the hands, especially after use has rendered them pervious; they often reflect high lights when clean, and are rather easily injured by washings with a wet sponge or rag. They are not permanent, and therefore in the long run are perhaps more expensive than most forms of blackboards.

(*c*) Slate blackboards, as indicated above, have been used in this country since the early part of the last century, but expensiveness and the difficulty of getting tablets sufficiently large and properly set prevented the use of this material from becoming at all common until comparatively recent years.

The following are the advantages of slate for blackboards: it has in general a dull black color, reflects no high lights, or at least not to any troublesome degree, will last indefinitely, takes the chalk easily and yet sparingly, gives a regular and clear mark from the crayon, does not absorb moisture readily, can be set solidly and firmly, is not injured by washings or scrubbings, and is not noisy when properly set. The disadvantages are these: it is expensive when the initial cost is considered, but not so when its permanency is taken into account; on large walls there are often troublesome joints owing to the impossibility of economically obtaining and handling slabs of the required length and width; hence long blackboards must be made of several slabs set together; it is not always easy to get slabs of identical color, owing to the variations in the different layers and even in different parts of the same stratum; it in time will absorb enough oil from the hands of the children to render it somewhat variable in its reflection of the light and the readiness with which it will cut the crayon; it is frequently a very difficult matter to get the exact shade of coloring in slate most suitable to the hygienic requirements of vision; it is rather difficult to set so that the joints will fit closely and evenly, and remain so, as the building settles and shrinks into its permanent form.

Still it is for general conditions one of the most satisfactory materials to use in the construction of blackboards, and school boards rarely made a mistake when supplying it. It is doubtless no exaggeration to say that it is the best material now generally available, and should be used for all brick, stone, or concrete buildings, for in the long run it will prove least expensive and most satisfactory.

(*d*) Glass blackboards were introduced into England a decade or two ago, and on the whole are proving very satisfactory. As these are as yet rarely found in our country, it seems well to explain briefly how they are made, as well as to set forth their advantages and defects. The glass, which has been cut into sheets to suit the specific requirements of the surface set apart for the blackboards, is ground on one side evenly, but lightly, so that it is translucent, and yet as smooth as possible. It is necessary for this grinding to be done carefully, otherwise the surface will be too rough, or will not take the chalk evenly, and hence render the writing variable and troublesome. This ground surface when correctly prepared gives to the finger tips when passed over it no great sense of roughness, but a sort of smooth, hard, velvety feeling. The opposite, or unground side, is then painted a dull dead black or a dull black slightly tinged with green. When this color is dry the glass is then ready to set. The ground side is the outside, while the black or painted side is set into the wall. Because of the fact that the glass is translucent, the color shows through from behind and seems to be a part of the glass. The ground surface cuts the crayon or talc sufficiently well to leave a clear even mark, and yet, if correctly ground, does not release an undue amount of chalk dust in the room. If the plates of glass are unusually large, the expense is increased; but it does not seem necessary to make them any larger than the slabs of slate ordinarily used, for, with the proper care in setting, the joints of the glass can be made to fit so closely that they are scarcely noticeable.

Since the painted side is wholly out of contact with dirty hands, crayons, erasers, and sponges, the color of the board remains permanent, uniform, and undisturbed in any way. Naturally the glass ought to be set solidly and evenly against a well-prepared back of wood or cement so that there will be no giving, nor hollow sound when the chalk is used. When so prepared they give forth very little noise, occasion no unpleasant scratchy sensations, and seem almost ideal surfaces for blackboard exercises. The advantages of glass blackboards are: the color can be made to suit the most exacting demands of the hygiene of vision; no high lights are possible from any part of the room; they will not absorb the oil from perspiring hands; they are impervious to moisture, and can be set against outside brick walls if the conditions demand it; they are easily and safely cleaned; they will last indefinitely and seem to grow more satisfactory through use, owing doubtless to the fact that the ground surface becomes more finely and evenly roughened; they are not noisy, and display a plain uniform mark; they will in time become inexpensive, and can be adjusted to the wall space as readily as hyloplate. The disadvantages which were noticed in the London schools, where they are commonly used, are these: the joints are slightly noticeable, and, if they separate a little, gather chalk dust; some teachers of art claim that they do not give an " artistic line." These objections seem comparatively insignificant when the main use of the blackboard is taken into the consideration. Clay, who doubtless had considered all materials carefully, says, "The best material for a black-board is probably roughened glass coloured black or dark green at the back, though the objection to this (glass) is that it wears away the chalk so quickly that it is difficult to keep a point for writing." (See Felix Clay, *Modern School Buildings*, p. 99, Botsford, London, 1902.) In the *Report of the Schoolhouse Commission* made to the Senate of the United States in 1908 relative to consolidation of schools in the District of Columbia, we are told, " The black-glass board is the ideal board, remaining permanently black, never needing repair, and being practically indestructible. It is, however, extremely expensive." (See p. 26.)

In addition to the kinds of boards here mentioned, there are a number of patented composition mostly made of paper or pulp compressed and coated with so-called liquid slating. They are rather inexpensive, and on inner walls free from moisture they serve very well for a number of years. But they will not stand much washing, and will in time buckle and warp and lose their color.

Position of Blackboards. — Naturally blackboards ought to be located where the pupils will have ready access to them, where they can be seen easily from the desks, and where they will receive plenty of light. With unilateral lighting, the teacher's board should be at the front end of the room, with preference given to the center and right half, as the children sit at their seats. This board should be higher from the floor than any other board in the room, in order that whatever may be placed thereon can be read easily from all parts of the room.

The bottom of the teacher's board should be 4 feet from the floor and the width of the board should be at least 3 feet. The bottom part of a teacher's board set lower than this is rarely if ever used, and the upper part, if higher than 7 feet above the floor, is usually out of reach of the average teacher, and therefore seldom used.

The blackboards especially designed for the use of the pupils should be placed on the wall opposite the windows, and also on the wall in the rear end of the room. All the available space of the proper height on these walls should be used for blackboards. In rooms designed for the children of the primary grades (from grade I to III, inclusive) the bottom of the blackboard should be set 26 inches above the floor, and the width of the board from bottom to top should be 30 inches. In the rooms designed to accommodate children of the intermediate grades (IV to VI inclusive), the bottom of the blackboard should be 30 inches from the floor, and the width of the board from bottom to top should be 36 inches. In rooms designed for children of the seventh and eighth grades and high school grades, it is best to set the board 3 feet above the floor and make it 3 feet 6 inches wide from bottom to top.

It will be well for school authorities to insist that their builders follow these figures closely, for by so doing the expense of blackboards will be diminished, less light-absorbing surface will be introduced, and, best of all, blackboards will be situated within the easy and normal reach of the children. There are many school buildings in our country, in which they are set so high above the floor that the children of the primary grades cannot reach them unless they stand on foot benches; and there are a multitude of others in which the boards are set so high as to render the upper half useless because out of reach of the pupils. In the two upper grades and the high school there are greater differences in the height of the children, and therefore all cannot be so evenly adjusted to the blackboard as in the lower grades. In high school the boys are often much taller than the girls, and hence there must be more room for adjustment than in the lower grades.

Chalk trays so placed as to catch all the chalk dust and to hold the crayons and erasers should be fastened immediately beneath the blackboards. These trays should be rounded on the inside and out; inside, to make it easy to collect and remove the chalk dust and any other dirt accumulating therein; outside, to get rid of sharp-cornered projections in the room.

It is helpful to set a wire screen in the chalk trough so as to prevent the crayons and the erasers from coming in contact with the dust which has fallen from the board. This wire must be set sufficiently below the level of this trough to prevent erasers and crayons from falling out. It can be hinged or clasped to the sides so that it will not get warped, or knocked out, and yet be easily removed when necessary to clean the dust out of the trough.

Under no condition, in old buildings or new, should there ever be a blackboard between windows, as it is impossible to read from a distance anything written on a board so placed.

Value. — Blackboards have become so much of a factor in our methods of work that we really wonder how old-time teachers did without them. They are not only valuable aids in our methods of presenting many subjects; they serve as a socializing agent of no small moment. They bring the individual pupil and his work directly before the whole class, stimulate him to self-dependence, and furnish a splendid opportunity for that democratic give-and-take criticism which he must meet in real life. They save the teacher much time, and furnish a ready means of giving daily drill and daily tests. It is entirely safe to say that American teachers and pupils get more help from blackboard work than do the teachers and students of any other nation.

F. B. D.

BLACKBURN UNIVERSITY, CARLINVILLE, ILL. — A coeducational institution organized in 1864–1865. Academic, collegiate, and musical departments are maintained. Admission to the college is by certificate from an approved high school or by examination requiring about 15 units of high school work. Degrees are conferred in arts, philosophy, and science. There are 7 professors on the faculty. Walter Hensill Bradley, Ph.D., is the president.

BLACKSTONE, SIR WILLIAM (1723–1780). — The author of the famous *Commentaries* has a certain importance in the history of education as one who strengthened the drift of theoretical or philosophic thought in the direction of compulsory education. He was indeed one of its earliest advocates, and gave expression to his views before the same position was adopted by Adam Smith and Jeremy Bentham. Writing on the subject of education (*Commentaries*, Book I, ch. 16) in 1765 he says, "As Puffendorf (*Law of Nations*, Basil Kennet's translation, 3d ed., 1717; Bk. VI, c. 2, 3, § 12, p. 379) very well observes, it is not easy to imagine or allow, that a parent has conferred any considerable benefit on his child, by bringing him into the world; if he afterwards entirely neglects his culture and education, and suffers him to grow up like a mere beast, to lead a life useless to others, and shameful to himself. Yet the municipal laws of most countries seem defective in this point, by not constraining the parent to bestow a proper education upon his children. Perhaps they thought it punishment enough to leave the parent, who neglects the instruction of his family, to labor under those griefs and inconveniences, which his family, so uninstructed, will be sure to bring upon him." This school of thought did in this way scarcely less than the practical energy of Bell (*q.v.*) and Lancaster (*q.v.*) or the political energy of Whitbread (*q.v.*), Brougham (*q.v.*), and Roebuck to produce a revival in English elementary education. The *Commentaries* of course are also a useful guide to some historical questions relating to education (such as Benefit of Clergy (*q.v.*), and tell us much as to the history of legal education. J. E. G. de M.

BLAIR, JAMES (1656–1743). — The first president of William and Mary College (*q.v.*) was born in Scotland and graduated at the University of Edinburgh in 1676. He was sent to America as a missionary by the Bishop of London in 1685. He became deeply interested in the educational needs of the colonists, and was the moving spirit in the organization of William and Mary College, and the president of this institution from 1692 to 1743. He was also interested in the education of the Indians, and endeavored to secure a special endowment for this purpose. Blair coöperated with H. Hartwell and Chilton in writing *The Present State of Virginia and the College* (London, 1727). W. S. M.

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BLAIRSVILLE COLLEGE FOR GIRLS, BLAIRSVILLE, PA. — Founded in 1857 as the Blairsville Seminary; present title dates from 1893. Preparatory, collegiate, and musical departments are maintained. Girls 12 years of age are admitted to the preparatory course. Admission into the college is by certificate from a high school or academy or by examination requiring about 10 points of high school work. Degrees are given in classical and literary courses. There are 12 instructors on the faculty.

BLANKS, FORMS AND USE OF. — See Reports and Records.

BLAURER, AMBROSIUS (1492–1564). — A German schoolman of the Reformation period. He was born in Constance and educated at the University of Tübingen. Having embraced the new faith, he introduced the Reformation in Constance, Ulm, and a number of other cities in Southern Germany. While drawing up church regulations for these, he always had special regard for the schools. In 1535 he reorganized the University of Tübingen.

BLEDSOE, ALBERT TAYLOR (1809–1877). — Educator, graduated from the United States Military Academy, 1830; instructor in Kenyon College and Miami University from 1833 to 1836; professor in the University of Mississippi from 1848 to 1854, and in the University of Virginia from 1854 to 1861; author of *Philosophy of Mathematics*. W. S. M.

BLIND, EDUCATION OF THE. — Blindness varies through all degrees of defective vision to absolute blindness, which is inability to perceive daylight. In a practical sense any one is blind who cannot distinguish common objects, and a child who cannot see ordinary print is admitted to our schools for the blind. It has been calculated that there is one sightless person in every thousand. The census of England and Wales for 1901 shows one blind person in 1285. The prevalence of blindness is greatest in Eastern countries, where little is done toward healing the diseases of the eye or improving the unsanitary conditions that cause them. In Western countries blindness is diminishing, especially among the more prosperous classes, which receive the benefits of advanced medical and surgical knowledge. Probably two fifths of all blindness is preventable by the application of modern medical treatment to defects and diseases of the eye and by the application of simple hygienic principles to domestic and industrial life. The Massachusetts Commission for the Blind issues a bulletin on the prevention of blindness from *ophthalmia neonatorum*, and various agencies in other states distribute similar bulletins; but many of our commonwealths have done nothing to check the needless waste of human eyes. A large portion of the blind are stricken in adult years in the midst of active lives; many of them are blinded by unnecessary accidents in mines and factories. Much blindness is but one result of disease which has caused other weaknesses of mind and body. M. Sizeranne (1887) finds that of the 40,000 blind in France and Algiers 4000 are minors, and that of these, after the feeble-minded and otherwise incapable are deducted, there remain from 1500 to 2000 from 5 to 15 years of age fit to benefit by the schools for the blind. He also believes that nearly all of the capable blind children find their way to the schools, and this is probably true in all the more progressive countries. It has been estimated that in Germany (1900) there were 3000 blind of school age and fit for instruction, and of these 2500 were in the schools. In America calculations based on the special census of Massachusetts and on that of New York State show that there are about 100,000 sightless in a population of over 80,000,000. A proper American census of defectives has not yet been taken. About 4500 pupils are enrolled in the schools of the United States. It may be that the thin distribution of our people over a great area tends to isolate some of the blind and deprive them of the opportunities which the state institutions offer; but this condition, if it exists, must yield before the increase of popular knowledge about the blind and a more thorough registration of defective classes.

Historical. — Until near the beginning of the nineteenth century it was not deemed necessary or possible to teach the sightless. Here and there an educated blind person distinguished himself by remarkable ability, usually one who had lost his sight after his education had been completed, and who continued work with which he had long been familiar. The masses of the blind remained in utter ignorance, neglected, shunned. They sat by the roadside and begged alms, and they were looked upon with superstitious pity. The gospel which Christianity had brought to the inflicted was strangely misinterpreted. Blindness, deafness, and mental defects were regarded as signs of the wrath of God against sinful man, to be patiently borne. Only two institutions for the sightless were founded during the Middle Ages, one in Memmingen, Bavaria, in 1178 (the story of this foundation is not well authenticated), and the other at Paris, the *Quinze-Vingts*, an asylum established by St. Louis in 1260 for 300 soldiers who had been blinded in war. This institution in a modified form is still in existence.

The deeper humanitarianism and more scientific spirit of modern times has replaced the idea of forlorn endurance with the nobler idea of alleviation and cure. In 1771 at a fair in Paris an innkeeper exhibited for the edification of the public a group of blind men attired in ridiculous garb, including pasteboard spectacles. They gave a "concert" for the benefit of their employer; and the people laughed, as the Elizabethans laughed at madness, thoughtlessly, good-naturedly. One of the spectators was Valentin Haüy, the Moses of the blind. He cast about for some means to make the lot of the blind less miserable, to teach them self-respect and usefulness. He bribed a bright-faced blind boy, Lesueur, to cease begging and submit to instruction. His success led to the founding, in 1784, of *L'Institution Nationale des Jeunes Aveugles*, the first school for the blind in the world.

When the possibility of teaching the blind was once demonstrated, the public was filled with wonder, and philanthropists and teachers were filled with joy and ambition; they took up the new work for humanity, and carried Haüy's ideas to other countries. Under the most adverse economic and political circumstances — it was the period of the Revolution — money was raised, and schools for the sightless sprang up in rapid succession. One was founded in Liverpool, 1791, another in Bristol, 1793, another in London, 1799; Norwich Asylum and School, 1805, Richmond National Institution in Dublin, 1810, an asylum in Aberdeen, 1812. New institutions have been founded in Great Britain every year or two during the last century. The early rapid development of the work for the blind in Great Britain is due partly to the admiration of the British for the great blind men of their race, Milton, Saunderson, the mathematician, Thomas Blacklock, the Scottish poet and preacher, and John Metcalf, the road builder, a man of astonishing energy and self-reliance. In Austria the first school was opened at Vienna by Johann Wilhelm Klein in 1804. Austria has been called the cradle of the education of the blind, for it was the Austrian singer, Maria Theresa von Paradis, herself blind, whose accomplishments inspired in Haüy and Klein the belief that the sightless can be raised not merely out of misery, but to high planes of culture and achievement. Klein's splendid energy resulted in the establishment of other institutions in Austria during the first half of the nineteenth century, and his influence contributed to the foundation of institutions in Germany and other parts of Europe. In the midst of bitter war — Napoleon was in the city! — the Royal Institution for the Blind was founded in Berlin in 1806. The institution at Dresden followed in 1809. Nine years later work for the blind began in Breslau, and from 1826 to 1830 schools were opened at Munich, Stuttgart, Bruchsal, Braunschweig, Hamburg. Holland made haste to begin the work of educating the blind, in 1808; Sweden followed in 1810, and Denmark, in 1811.

Most of the early institutions for the blind were enterprises undertaken by generous individuals and philanthropic societies. But gradually civil authorities came more and more to feel it their duty to extend the education of the blind as well as of the seeing. To-day most institutions for the blind in Europe and America receive aid from the province or state, and are under the control of the government.

The work for the blind in America began a generation later than the work in Europe. Dr. Howe in Boston, Ackerly and Russ in New York, Friedländer in Philadelphia, were the pioneers in this country, and entered upon their labors in the early thirties. Other states followed, until now there are 42 schools in America, roughly speaking, one for each commonwealth. Pennsylvania and New York have 2 each. Some states, such as New Jersey, Vermont, and New Hampshire, have none, but make provision to send blind pupils to neighboring states.

Most of the institutions in America are supported wholly by the State, though several, notably the Perkins Institution at Boston, the Pennsylvania Institution near Philadelphia, and the institution in New York City, are supported also by endowments. Only 4 of these institutions for the instruction of the young blind were founded within the last 10 years. When it is remembered that of the 17 or 18 industrial establishments for the blind of the United States more than half came into existence within the last decade, it will be seen that during the first 75 years of work for the blind in America, attention was almost exclusively confined to the teaching of the young blind.

Almost all the schools offer some sort of industrial training or business course. But with one or two exceptions they have no adequate records of the careers of their graduates in after life, so that their efficiency is hard to measure. In this they do not differ from our common schools for the seeing.

Some Principles in the Education of the Blind. — The institutions for the blind in the several countries reflect the educational ideals of the schools for the seeing. In France, where the public is artistic and music loving, there seem to be more successful blind musicians than in any other country, though Dr. Campbell's great school in England, the Royal Normal College and Academy of Music for the Blind, is inferior to none in the world. The effort in Germany is to fit each individual, seeing or blind, to be an independent workman contributing to the national welfare; Germany therefore has built up the best balanced system of intellectual and industrial training, and, as would be expected, the work for the blind in Germany embodies a similar ideal of balance, unity, and completeness. It should be noted, too, that in Germany the teachers of the blind are almost all normal school graduates with teaching experience in the elementary schools, and are therefore, as a class, superior to the average teacher in other countries. In Great Britain the tendency has been to keep the blind, who are mostly from the poorer classes, in the ranks of the lower-grade workman, and England and Scotland have been remarkably successful in carrying out the sensible and practical idea of providing manual occupation for as many of the blind as possible. Intellectual education has not, until recently, been extended to so many of the sightless in Great Britain as in America, and yet a generation ago no country in the world would have equaled the readiness with which the English people recognized and promoted to high position such a blind man as Henry Fawcett, who became postmaster-general. In America the prevalent educational ideal has been to offer to everybody a common school education, and to trust that the individual, following his own inclinations and plunging into practical work, will find in the work itself the special training needed to prepare him for it! A beginning to provide trades schools even for the seeing is only just being made. Few states have correlated and unified the education of the seeing into an effective system. But under any system, if it is as generous and free-for-all as the American, the seeing person will find himself, whereas the blind man is left unguided. Almost any American blind child can go to a school and learn geometry and Latin. But with our 40 schools for the blind we have only a score of industrial establishments, of which only 10 are state institutions or receive state aid. In them about 600 men and women are employed. In Great Britain, which has half the population and so about half the number of blind of this country, there are 50 workshops employing some 2000 men and women. Twelve of the state schools in America are combined institutions for the deaf and the blind,— a combination which is bad for both classes. As a whole, the work for the blind in America is generous, energetic, and disorderly, and yet several of the schools taken by themselves are wonderfully fine. What a recent writer says about the work done for the deaf by " the receptive and thorough American " is true of the work for the blind: the blind person "is being experimented with on a colossal scale. More money is being spent on him than in any other country in the world, and although not the shortest, nor the cheapest, nor in any sense the best way, this is one way of getting at the truth — and the Americans will get at the truth whatever it costs." Any comparison of the work done in the various countries becomes untrue even as it is written. Every country is trying to find out what other countries are doing, and to import the best. Industrial education for the blind and other systematic effort to prepare the blind to take their rightful places in the social scheme is advancing rapidly in America. Several states have recently created commissions, and volunteer associations are being formed in many cities. Though the new work does not always merge economically and without friction into the work that is already established and traditional, all streams of education and enterprise in behalf of the blind must in time find their beds, unite, and flow increasingly together. Besides the wealth and energy brought to bear on the problems of the blind in America, there is in the American system one principle which is fundamentally established, and more than anything else insures success in the end, that is, the principle that the sightless are not objects of willful charity, to be set outside of the social scheme, but they have a right to the best education that can be devised, and the State must provide it.

When the education of the blind was a new enterprise in Europe and America, philanthropists and teachers were enthusiastic idealists — if they had not been, the work would never have been started. They dreamed that the sightless, because of their freedom from the distractions of the outer world, would be able to concentrate their minds upon lofty themes and become brilliant poets, mathematicians, musicians. For a while this belief seemed to be justified; only the brighter, more enterprising blind went to the new institutions. But later the mediocre and the inferior came in large numbers, and teachers found themselves confronted with a class of people below the average in general health and therefore in ability. The disappointment, however, had a steadying effect; it led teachers to study the nature of blindness and put the work on a practical basis. The labor of lifting the sightless out of misery became more and more rational without losing all of its initial enthusiasm, and the history of it is a touching record of disinterested effort, patience, and devotion.

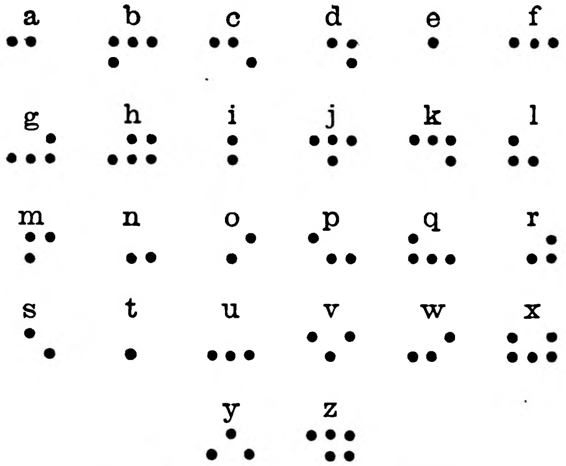
Present Position. — The education of the blind child does not differ essentially from that of the child who sees. Both are taught to study, to work, to live with other people. They are equally susceptible to lessons and discipline, provided the blind child has no other disability than lack of sight. Differences in the methods of teaching the blind and the seeing arise from differences in their sense experience. The blind learn through hearing and touch; they read raised letters instead of flat. They are not shut out from the richest source of civilized knowledge, the spoken words of men, and they make the same identity between the the embossed letters and the spoken word that the seeing person makes between oral language and flat letters. For the blind person the process of reading the world of objects, and the printed letters that symbolize them, is slower than the corresponding process of the sighted person. Sight surveys, includes, makes rapid and sweeping comparisons. The sense of touch perceives points and assembles disjointed impressions; it constructs, measures, and synthesizes. It conveys to the mind very much more than the seeing person is wont to believe possible unless he has read Berkeley and other philosophers and psychologists. The blind man who suddenly recovers his sight cannot recognize by sight alone objects with which his fingers are familiar. He has to learn to see, to interpret visual impressions in the light of tactual experience. Touch is the fundamental sense. With the sight shut off, the intellect is still amply nourished. The gravest ill consequences of blindness are not intellectual, but physical.

The normal child constantly sees others move, work, and play. He imitates, and so he grows. He is active, eager to do, to explore, to investigate. The incentive of things without stirs the inner impulse to action and exercise. He romps and dances through his first years, daily aroused by the friendly, challenging rays of light. He revels in the freedom of playground, the woods, the fields, or the alley and the crowded street. Attracted by bright colors from afar, by the bustle and the thousand sights of the city and the country, he is ever in motion. The elastic movements of his body, which he unconsciously learns from others, keep him straight, graceful, and vigorous.

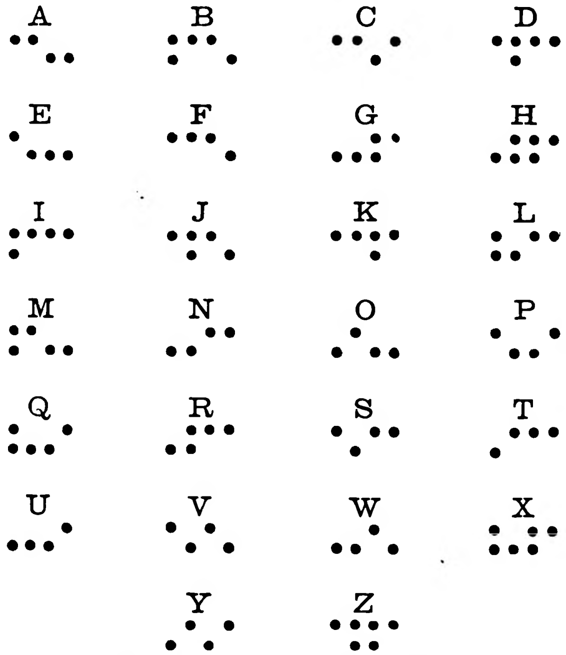
The blind child who is not taught falls into ill health, which is far more damaging to his mind than mere blindness. Cut off from the swirl and rush of life in the outer world, the frolics of other children, and the cheerful work of men, he is deprived of stimuli that not only enliven the brain, but stir the body to action. He sees nothing to imitate, and he is easily discouraged from imitating the activity that he can hear. Unused muscles relax and degenerate, and the whole organism is enfeebled. A similar degeneration can take place in one who loses sight in adult years, who sits and mopes and takes no exercise. But the case of the blind child is more heartbreaking because he cannot help himself; he is dependent on his parents, who may spoil him with misdirected kindness or selfishly keep him "quiet" and "out of the way." Intelligent care can put a blind child on almost equal terms with the seeing by deliberately supplying the stimuli that blindness cheats him of. He should be taught to walk at the same age as a seeing child. He should be encouraged to touch a great variety of objects, and should have plenty of simple toys to throw around, to hunt for, to put into his mouth if he chooses. He should be led into the habit of quick, sprightly movements, so that he will skip and run like other children, regardless of bumps and falls. The merry spirit should be awakened in him, so that he will play games alone. He should be permitted to handle common household articles and turn the house into a playroom, act the sailor, the soldier, the carpenter, and Mowgli in the jungle. He can model in clay or putty, spin tops, beat a drum, make chains of spools, peel potatoes, shell peas, and play at other useful occupations. He can work at a bench with hammer and saw, nails, and pieces of wood. He will not cut himself any oftener than the seeing child. Interesting tasks occupy his mind, keep him in health, render his fingers firm, flexible, precise, and cultivate a habit of observation.

It is important for success and happiness in life that a blind person should have an attractive face, natural gestures, and good carriage. The blind child should be allowed to touch the faces of others, so that he can perceive the smiles, the varying motions of the head, the looks of sorrow or delight, and so imitate them. If he is left too much alone, he falls into nervous habits called "blindisms," habits which bring debility and unhappiness. He makes faces, uses his fork wrongly, sniffs, sticks his fingers in his eyes, and sways from one foot to the other. Such habits are too frequent among sightless children at the institutions, and the schools are thus needlessly burdened with the task of overcoming timidity, ungraceful manners, and disagreeable gestures that should have been corrected at home. Since the average home cannot be counted on as a fit school for the blind child, there is need of nurseries and kindergartens in every large town.

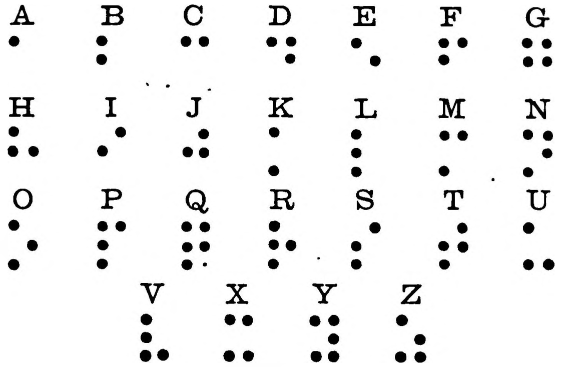
There are 3 nurseries for blind babies in America, at Hartford, Boston, and Brooklyn. The first kindergarten for the blind was established in Moritzburg, Germany, in 1861. Similar kindergartens have since been opened in Copenhagen, Bennekom (Holland), Düren (Germany), Königsthal, Leipzig, München, Neukloster, Nürnberg, Steglitz, Kleefeld, and


a b c d e f
g h i j k l
m n o p q r
s t u v w x
y z

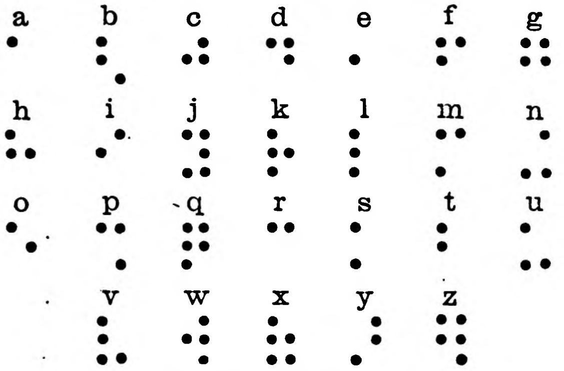
New York Point, Lower Case


A B C D
E F G H
I J K L
M N O P
Q R S T
U V W X
Y Z

New York Point, Capitals


A B C D E F G
H I J K L M N
O P Q R S T U
V X Y Z

English Braille


a b c d e f g
h i j k l m n
o p q r s t u
v w x y z

American Braille

To capitalize a letter prefix to it points 3 and 6 (● ●) leaving a space before the letter to be capitalized.

Vienna. Some German schools have a kindergarten department. In America there are 2 kindergartens, one in Boston, connected with the Perkins Institution, and the other a department, in a separate building, of the Pennsylvania Institution. The functions of these nurseries and kindergartens are (1) to furnish the blind child with many ideas and experiences that come to the normal child without special instruction, (2) to correct the evils that result from his being coddled at home, (3) to conquer nervous habits and avert their bad effects, (4) to sharpen and train hearing and touch, (5) to strengthen the body by means of exercise.

Curricula and Apparatus. — The curricula of the ordinary institutions for the young blind are about the same as those of the common schools for the seeing, — reading, writing, arithmetic, geography, history, etc. The chief difference in method lies in the apparatus, and is at once suggested by a study of the apparatus itself.

The first embossed book for the blind was printed at the Paris Institution in 1786. The early books were expensive, not easy to read, and were used chiefly for exhibition purposes. The type was a form of Roman letter. Many persons experimented with variations of our common letters and arbitrary arrangements of lines and curves. In 1836 about twenty line alphabets were submitted to the Society of Arts for Scotland. That by James Gall was chosen, and books were printed in it. The Boston line letter, later improved by Dr. Howe, persisted for long in America. But except for the very useful Moon type for the elderly blind and those whose fingers are insensitive, all line alphabets have been abandoned (the Perkins Institution only recently discontinued the printing of Roman line) in favor of point systems, braille and two variants of it.

The base of braille is a cell of 6 points, thus ⠿ The characters consist of various combinations of these 6 points. For instance, 3 points in a vertical line form the letter L. If the middle dot is struck out and another placed at the right of the lower dot, the letter is U, and so on. There are 62 characters. Each represents a letter, a punctuation mark, or a contraction standing for several letters. This point system was made by Louis Braille in 1825, and bears his name. It is used all over the world. American braille embodies some changes, not in the form of the letters, but in the assignment of the letters to the various combinations. The idea was that the letters which occur most frequently, such as E, O, R, S, T, should be made with the fewest dots. The changes do not alter the mechanical structure of the type any more than the mechanical structure of this ink type would be altered if it should be agreed to print *s* for *e* and *e* for *s*. New York point differs from braille in that the characters are not 3 points high and 2 wide, but 2 points high and 3 wide. It has no advantages, and some disadvantages as compared with braille. The variety of prints has caused some confusion and has resulted in reduplication of books. Some American institutions are provincial enough to cling to New York point when other American institutions and the whole of Europe use braille both for literature and for music. But any enterprising blind person who knows one print can easily learn another. The point systems can be written for notes, correspondence and manuscript books, on special writing machines and also by means of small hand frames and a stylus to indent the points. To write ink print the blind can use any kind of typewriter, and typewriting is taught in the best schools. The blind also write pencil script, and there are several ingenious devices to guide the pencil.

INTERLINING BRAILLE SLATE.

For arithmetic the best instrument is the brain, in which figures can be written on the memory and combined and erased with ease. There are several mechanical devices to assist the pupil. Ballu's calculator consists of a rectangular board divided by raised metal lines into equal squares. Each square is pierced with 9 holes. Each hole corresponds to a figure, and a pin in one of the holes indicates which figure that square stands for. A special pin gives zero in one position and 8 algebraic signs in the other positions. Taylor's frame is a metal plate filled with holes shaped like 8-pointed stars, the holes equidistant. A square peg, with a ridge on the side of one end, and 2 points on the side of the other end, will obviously take 16 positions in the octagonal hole, and so represent the 10 figures and the signs of multiplication, addition, etc. Some of the blind become rapid and accurate in mental calculations. The principles of geometry can be learned without visible or tangible diagrams. To assist the blind student there are several devices. One is a cushion with curved and straight wires, the ends of which are pointed and cling to the cushion. Construction lines can be drawn with strings and pins, and the points of the diagram can be lettered with pins, the heads of which form braille characters.

In studying geography the blind explore raised maps and globes with the land raised and the seas depressed, the rivers represented by fissures, the capital cities by large points, and the other cities by small points. If the globe is large enough, the names of the countries, seas, rivers, and cities are printed in embossed type. Dissected maps make a pleasant game and convey useful lessons. The physical sciences are taught the blind by laboratory methods, with the same models and apparatus that are used by the seeing. Manikins that can be taken apart are used to teach anatomy. Some of the institutions have museums of stuffed birds, animals, and other objects. The institution at Illzach, Germany, manufactures embossed pictures of birds and animals. In history, languages, and literature, all the humanities that are embodied in printed words, the resources of the blind are all but equal to those of the seeing, as will become evident from a glance at the catalogues of books printed for the blind in Europe and America. The United States has printed more books than any other country, and the invention of special presses to emboss type has so cheapened and multiplied books for the sightless that in the last ten years probably more books have been printed here than in all the years before. The institutions have good libraries, and they lend their books to blind persons for the asking. The Post-office Department carries them free. There is no other class of people in the world that have books delivered at their doors for nothing. The American Printing House for the Blind at Louisville receives $10,000 a year from the United States Government; the books paid for by this fund are distributed to the various institutions. The Congressional Library in Washington maintains a spacious reading room for the blind, containing about 2500 volumes. The public libraries in several of the larger cities have embossed books which are taken out on cards like the books in ink. The Public Library of New York City has a branch for the use of the blind containing about 2500 volumes; it maintains a teacher who visits the blind that cannot read and gives them free instruction. The state of Massachusetts and several of the private organizations for the blind employ teachers to give instruction to the sightless at their homes. The Pennsylvania Home Teaching Society provides books in Moon type, and sends teachers to the blind who live in Philadelphia.

There are special schools or departments for the instruction of weak-minded and backward blind children in Vienna, Kiel, Chemnitz, (in Saxony), Lausanne, Paris, and Copenhagen. In America the feeble-minded blind are not properly provided for. They should not be in the regular school for the blind, and the ordinary institutions for the feeble-minded are not fitted to cope with the double infirmity and mitigate it so far as mitigation is possible. A unique institution is that in Venersborg, Sweden, for deaf-blind children. In other countries the education of the deaf-blind has been conducted in the schools for the deaf and the schools for the blind and by private teachers (see DEAF-BLIND, EDUCATION OF).

Industrial Training. — The education of the sightless does not end with their graduation from the ordinary institutions. It remains for them to be trained so that they can earn all or part of their support. The manual departments of the institutions give elementary training in handicrafts, and special industrial establishments are multiplying, but this work for the blind has not advanced far enough in any country, certainly not in America. Blind workmen need not only instruction in the crafts, but competent supervision and assistance after they have begun to produce articles for sale. Many of the blind in America have been encouraged to make useless and ugly things by the patronage of kindly persons who were sorry for the workmen. The productions of blind workmen should compete fairly in the markets, and the handicap of the workers should be recognized and relieved by assistance in the processes of manufacture and of distribution and sale.

The chief industries of the blind are basketry, weaving, cordage, mattress making, brush making, and chair caning. At the shops of the Massachusetts Commission are manufactured not only an excellent patented mop, but very beautiful curtains and rugs. At the trade school in Marseilles the blind engage in fine beadwork and cabinet work with the aid of seeing persons. A few of the blind are employed in copying braille books for the libraries and their more prosperous brothers. The practice of massage is steadily gaining ground among the blind of France, Germany, England, and America. In Japan massage has long been a recognized monopoly for the blind. Retail trade is a fruitful field for the blind, and business courses and training in salesmanship are legitimate branches of education for our institutions to develop. In Great Britain the Blind Tea Agency sells tea, coffee, and cocoa, and employs only blind salesmen. A number of successful American salesmen are blind. Several expert blind typists have found employment with business firms. Efforts are being made to find more and more profitable occupations for the sightless. Since trades and industries vary in different communities the finding of suitable work for the blind, and in large part the preparation of the blind for the work must be a local matter.

The most talented of the sightless are educated as musicians, organists, piano tuners, teachers. There have been blind men on both sides of the Atlantic eminent in intellectual work, Rodenbach the Belgian statesman, Fawcett, the English statesman, Senator Gore from Oklahoma, Huber, the naturalist, Prescott, the historian, and others. The Royal Normal College in England and L'Institution Nationale in Paris have educated many blind musicians and helped them to positions of self-support; but only a few of the blind are capable of becoming competent musicians, and in order that the hard-won reputation of the blind may be sustained, care must be taken not to encourage sightless persons of mediocre ability to appear before the public as products of the musical departments of the schools.

In order to help the adult blind, both the graduates of the schools and those who have lost their sight in maturity, there must be increasing coöperation between the institutions and the public, between the schools and their graduates, and among the blind themselves. There are several organizations at work bringing about this coöperation; notably the British and Foreign Blind Association, the Valentin Haüy Association of France, the New York Association, and the Massachusetts Association. State commissions working together with local volunteer organizations and the already established schools could and should form such unified systems as have grown up in Massachusetts and in Saxony. In Massachusetts the State Commission, the Perkins Institution, and the volunteer association, with its valuable paper, *The Outlook for the Blind,* are working together. In Saxony the work for the sightless centers in the multiple. institution at Chemnitz. This institution comprises, in separate departments, a kindergarten, a common school, a trade school, a school for feeble-minded blind, homes for aged and incapable blind, and houses for capable blind men and women. It has a fund from which sums are lent to blind men who set up as artisans, and the institution supervises the work that the graduates are doing in their homes throughout Saxony. A bond of unity and a strong practical educational force among the blind of America is the *Ziegler Magazine,* printed in point, which, through Mrs. Ziegler's generosity, is distributed free to the sightless. The American blind are beginning to know each other, to know the merits and defects of existing institutions, and to learn what is being done in Europe.

Several recent experiments in behalf of the blind deserve mention, though the results are not yet known. The good Queen of Roumania has founded a colony for the blind, the *Vatra Luminosa,* where persons of all races and religions may work side by side at profitable occupations and live in separate houses with their families. The principle of segregation involved in this plan is contrary to the prevailing effort in other countries, which seeks to distribute the blind among the seeing, to teach the public to take the capabilities of the blind for granted, and to give them a place in the midst of normal life. Experiments are being made in Milwaukee, Chicago, and New York City to teach the blind in the public schools. There are 30 sightless children in the Chicago schools, and the reports of their progress are encouraging. The average cost is $175 a year, whereas the average cost per pupil in the institutions is $270. But the institutions are boarding schools, and the per capita cost includes food and shelter. If the necessary books and apparatus are provided, and a special teacher is maintained to prepare the pupils to take part in regular classroom work, there is no reason why the blind child should not keep up with his seeing fellow pupils, learn much from them, and be a means of teaching the rising generation the needs and the capabilities of the sightless. A considerable number of blind students have graduated from our universities, and there have been several blind professors in colleges for the seeing. It has been proposed to found a national college for the blind, but this would be a costly and superfluous institution. A better plan is to give scholarships to sightless students, as is done in New York State, which offers subsidies of $300 each to blind students in the colleges of the state. Further assistance to the sightless who are working for a higher education might be given in the form of braille transcripts of such textbooks as are not to be found among the books printed in embossed type.

The present hopeful tendency in the education of the blind is, like the tendency in the education of the seeing, to relate instruction to the uses of life. The methods, the available forces, the types of institutions have been indicated. The work of the future is to strengthen and intensify the institutions already established, to add others that are lacking in the various communities, and to bring about full coöperation between the institutions in the several states and nations. The collective functions of the agencies at work for the blind are: (1) to prevent blindness and disseminate a knowledge of the methods of prevention; (2) to teach the public about the blind; (3) to found adequate nurseries, kindergartens, and schools, and improve such as exist; (4) to open workshops in populous centers and to systematize the marketing of the products of the sightless; (5) to help the blind worker over the days when he is establishing himself in business, and to provide the materials of his work at minimum cost; (6) to seek out the blind in their homes and teach them reading, writing, and handicrafts; (7) to find a greater variety of paying occupations in which the sightless can engage; (8) to register all blind children and see that they find their way to the institutions provided for them; (9) to reach the blind in their isolation and inform them of the possibilities of their blindhood in order that they may avail themselves of the advantages already provided and of the enlightening experience of other blind persons.

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BLIND-DEAF, EDUCATION OF. — See DEAF-BLIND, EDUCATION OF.

BLIND SPOT. — Draw two small circles on a piece of paper 6 or 8 inches apart; close the left eye, and fixate with the right the left-hand circle, moving the paper slowly back and forth from the eyes. At a certain distance from the eyes (dependent on the distance between the circles) the right-hand circle will disappear from vision. For the left eye the right-hand circle must be fixated. The given circle disappears because the light rays from it have fallen on that area of the retina where the optic nerve leaves the eye. This is called the blind spot, therefore, because the optic nerve is not directly sensitive to light. The influence of the blind spot is not usually felt even in monocular vision — a printed page or the wall of a room appears as a uniform surface. This is partly due to the fact that our significant reactions to an object are elicited by the *sensitive* retinal points stimulated and not by the *insensitive;* partly, too, to the substitution of other experience with the object (*e.g.* binocular vision (*q.v.*), eye movements (*q.v.*), etc.). The existence of a blind spot shows, however, that we cannot always rely upon the results of introspection in interpreting a given phenomenon.

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BLINDNESS. — Inability to see normally. There are all degrees of blindness. These are due either to defects of the organ of sense (peripheral blindness) or to defects in the central organs (mental blindness). There are also defects in ability to discriminate visual qualities. (See COLOR BLINDNESS; DEAFNESS.)

BLINDNESS, PSYCHICAL. — Also called *mind* or *mental* blindness; involves an inability to recognize the nature and significance of objects by means of vision. The visual sensations are not lost; they may exist in their full variety; they are simply incorrectly interpreted, or not interpreted at all. This defect is doubtless due to the disintegration of the rich network of associative relationships into which visual elements must enter before they signify complete objects. Support is given such a view by the character of the cortical lesions which cause psychical blindness. They appear to occur chiefly in the posterior portion of the parietal association area just in front of the occipital lobe, which includes the cortical centers for visual sensation. Psychical blindness has been artificially produced in dogs by extirpating certain parts of the occipital lobe. Word blindness (inability to grasp the significance of printed words) is a special variety of psychical blindness. Analogous to psychical blindness is mental deafness.

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BLINN MEMORIAL COLLEGE, BRENHAM, TEX. — Founded in 1882 by the Southern German Conference of the Methodist Episcopal Church, and opened in 1883. Preparatory, academic, normal, commercial, and music courses are offered. No degrees are given. A theological course conducted in German is also included. There are 13 instructors on the faculty. John Pluenneke, B.S., D.D., is the president.

BLUE MOUNTAIN COLLEGE, BLUE MOUNTAIN, MISS. — A proprietary institution for the education of young ladies, opened in 1873. Preparatory, collegiate, and musical departments are maintained. The 4 years' course for the degree is based on about 4 points of high school work.

BLUE RIDGE COLLEGE, BLUE RIDGE, GA. — A coeducational institution organized as a college in 1904. Primary, academic, collegiate, normal, and business courses are maintained. The college course of 4 years, on the completion of which degrees are given, is based on approximately 3 years of high school work.

BLUNDEVILLE, THOMAS. — A country gentleman in Queen Elizabeth's reign; translated in 1570, from the Italian of Alfonso D'Ulloa, the Spanish treatise of Federigo Furio on the training of a prince, which contains much educational matter. In the same year (1570), it was possibly Blundeville who translated John Sturm's book on the education of princes under the title, *A Rich Storehouse or Treasurie, for the Nobilitie, etc.* He also translated, in 1574, from the Italian, Patrizi's *True order and Methode of wryting and reading Hystories.* In 1589, he wrote *A Briefe Description of universal Mappes and Cardes and of their use; and also the use of Ptholemy his Tables.* Having thus translated a work on education generally, on history study, on geography study, he wrote a work on the *Art of Logike,* 1599, in English, founded on Aristotle "and all other best account Authors thereof." In 1594 appeared his *Exercises, containing six Treatises, viz. on Arithmetic, Cosmography, Description of the Globes, description of the Universal Map of Plancius, of the Astrolabe of Mr. Blagrave, and of the Principles of Navigation.* In this work, Blundeville established himself as the first introducer into England of plane trigonometry. The *Exercises* were issued in augmented editions in 1597, the fourth edition in 1613; the sixth edition in 1621–1622; and the seventh edition, enlarged by R. Hartwell, appeared in 1636. Blundeville may be said to be the representative writer of Queen Elizabeth's reign on the encyclopedic education of the nobleman. In addition to writings on the above subjects of instruction, he is perhaps even better known by his treatise on the *Four chiefest Offices belonging to Horsemanship,* in editions 1565–1566, 1570, and 1609. F. W.

BLUSH. — The peripheral blood vessels, especially of the face and neck, react in certain emotional states so as to bring a large blood supply into the skin. This is an instinctive reaction. See Darwin's *Expression of the Emotions* for an interesting general discussion of its significance. It is a typical emotional reaction, without adaptive value at the present time.

BOARD OF EDUCATION, CONVENTIONS OF. — See CONVENTIONS, SCHOOL BOARDS.

BOARD OF EDUCATION, ENGLAND AND WALES. — See GREAT BRITAIN, EDUCATION IN.

BOARD OF EDUCATION OF THE METHODIST EPISCOPAL CHURCH. — See COLLEGE BOARDS IN EDUCATION, DENOMINATIONAL.

BOARD OF EDUCATION OF THE METHODIST EPISCOPAL CHURCH, SOUTH. — See COLLEGE BOARDS OF EDUCATION, DENOMINATIONAL.

BOARD OF EDUCATION OF THE REFORMED CHURCH IN AMERICA. — See COLLEGE BOARDS OF EDUCATION, DENOMINATIONAL.

BOARD OF GOVERNORS. — See BOARDS OF CONTROL.

BOARD OF REGENTS. — A term applied to the governing bodies of a number of our universities. For this see BOARDS OF CONTROL. The term is also used for what is virtually the State Board of Education of the State of New York. For this see the article on NEW YORK, STATE OF.

BOARD SCHOOLS. — See GREAT BRITAIN, EDUCATION IN.

BOARDING ROUND OF TEACHERS. — The first reference to the movement of teachers from house to house and school to school appears in the Commonwealth Act of 1649 "for the better propagation and preaching of the Gospel in Wales," in which provision is made for the appointment of schoolmasters in parochial charges or in "itinerary" courses, "for the keeping of schools and education of children." Itinerant teachers there were in England in the Middle Ages, members of the universities of Oxford and Cambridge, who took the license of their university and the letters testimonial of their chancellor, and under the protection of the Statute Law of the Realm wandered from place to place and were paid with bed and board for the diffusion of scholarship and the encouragement of learning. The history of these wandering scholars has been traced elsewhere (see *Special Reports of the Board of Education* (England), 1908, Vol. 21), and it is sufficient to say that the universities seem to have issued licenses as late as 1640, when a man was arrested at Malton in the North Riding of Yorkshire for begging with a counterfeit university pass. (See *Quarter Session Records, North Riding Record,* Vol. IV, p. 183.) Apart from these wandering scholars, who at last degenerated into common beggars, there do not appear to have been in England proper any itinerant teachers. But such teachers were common in Scotland as well as in Wales. The Welsh Circulating Schools (*q.v.*) were started by Griffith Jones (1683–1761) in 1730, and were at first entirely supported out of church offertories. The teachers stopped in each town or college for a few months only at a time, and were supported locally. The movement was supported by Mrs. Bevan (*q.v.*), and in 1752 there were 134 schools, with 5118 scholars. In 1760 there were 10,000 children in the schools, while the evening schools were still more extensively attended. The schools ended through a chancery suit soon after Mrs. Bevan's death in 1779, but they were revived under a decree of the Court of Chancery in 1807. These circulating schools numbered 34 in 1836. The teachers remained at each center from 6 to 12 months. In each center there were from 50 to 140 children, who were taught the alphabet, spelling, reading, writing, arithmetic, and Scripture. By this date, however, presumably the teachers paid for board, as they received £25 annual salary. In Scotland during the eighteenth and early nineteenth centuries the teachers were very often "boarded round." Mr. Brougham in his famous speech of June 28, 1820, in the House of Commons, said on this point: "In Scotland there were parishes fifteen miles in length, and six in breadth. It was easier for an adult to go to church than for a child to go to school in such cases. But what was the expedient suggested by their zeal and ingenuity? The schoolmaster was taken into houses successively, and was boarded as remuneration for his trouble in teaching the children. Scotland was not remarkable for abundance of animal food, but the parents gave him some kind of subsistence, probably better suited to their means than his appetite." Probably much the same principle was adopted in Ireland. Mr. Brougham went on to point out that the same principle of "boarding round of teacher" prevailed in the Pyrenees. "It was observed in a Report of the French commissioners that 'happy was the schoolmaster who lived in the rugged districts of the Pyrenees; there he was at least sure of not dying of hunger,' for those having no money boarded him by rotation." Exactly the same principle seems to have been introduced into the Cape by de Mist, the Commissioner-General sent to South Africa by the Batavian Republic in 1804 to take over the colony from England. In thinly populated districts itinerant schoolmasters were introduced by Sir John Cradock, who had put himself, in 1807, into touch with de Mist's Education Commission after the resumption of the Colony by England. The method was indeed the obvious method in any half-developed rural area, and forms a definite stage in the early history of rural education.

J. E. G. de M.

In Germany the practice of boarding round of teachers (*Freitisch, Reihetisch, Wandeltisch*) was quite common until the thirties of the nineteenth century. In many cases this system of part payment of salaries was preferred to payment in foodstuffs, which the teacher would have to cook himself. The practice of boarding round was particularly frequent in the case of the peripatetic teacher (*Wanderlehrer*) and the teacher of the winter school (*Winterschule*), for in both cases the local community possessed no schoolhouse or accommodation for the teacher other than the homes of the members. But boarding round is found also in city school systems; thus at Zwickau in 1521 the Council makes an agreement that the teacher and his assistants shall be boarded by the citizens. In 1545 an agreement was made at Hildburghausen that the schoolmaster should receive his meals at the pastor's house. In 1753 it was found by the school visitors in the county of Wildstein that the parents had withdrawn their children from the local school, leaving the teacher without his regular meals for fourteen days. In Potsdam as late as 1771 the members of the Reformed Church refused to board the teachers; the rest of the school community appealed to the King, who dismissed the matter with a joke, with the result that all refused to be responsible for the maintenance of the teacher. At the beginning of the last century a class of provisional teachers was appointed in Saxe-Meiningen, and received part of their salary in board. Wilberg, a contemporary of Diesterweg, records that the practice of boarding round was common in Westphalia in his day, the teachers moving round from house to house daily or weekly. In the administrative county of Magdeburg it was necessary in 1818 to issue an ordinance that no teacher should be engaged for any period less than one year, and that until satisfactory schoolhouses would be built teachers must be boarded round. An ordinance had, however, been passed in 1811 in Prussia abolishing the practice of boarding round in part payment of salary; in future teachers had the option of retaining or giving up the custom. But in Saxony it was found in the course of an inquiry that as many as 224 teachers received part of their salary in board in 1833. The law of 1835 abolished this practice in that state. The rise of state systems of elementary education with fixed minima of salaries put an end to a practice which was never satisfactory to either of the parties concerned, and always served to keep the teachers in degradation.

In the United States. — The practice of "boarding round" is a very natural makeshift in any poor and rural frontier community where a group of neighbors maintain a school by agreeing among themselves to be responsible for the schoolmaster's salary, in whole or in part. Wherever such conditions exist, we may well expect to find the practice. And we do, in fact, find it in America from early colonial days to within recent times. Of Delaware in 1720, for example, we read that "some schoolmasters are hired by the year, by a knot of families who, in their turn, entertain him monthly, and the poor man lives in their houses like one that begged an alms, more than like a person in credit and authority." The same seems to be in existence on Long Island in 1728, where we read that "the usual custom is for a set of neighbors to engage a schoolmaster for one year. . . . The common rule for payment is by subscription, £20 with diet or £30 without." The evidence is more abundant for the early nineteenth-century period. Barnard states that "the district system required of the instructor to itinerate among the different families of the district." One who taught in Connecticut about 1800 says, "It was an almost universal custom for the teacher to board round." A writer in Barnard's Journal says of his experience in New York State in 1839, "It was the uniform custom there, as now in many quarters, for the teacher to 'board around.'" Wickersham says of Pennsylvania during the same general period, "It was customary, in most sections of the state, for the master to board around among the patrons of his school, remaining with each a stipulated time." Even in the last decade of the nineteenth century the custom prevailed in some isolated rural regions, as no doubt it does yet.

The conclusion seems warranted that the practice of "boarding around" was general throughout the more rural regions of America until well into the nineteenth century. Since that time with the rise of state systems it has gradually passed away.

See Begging Students; Circulating Schools; Moving Schools; Traveling Teachers; Wandering Scholars.

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Montmorency, J. E. G. de. *State Intervention in English Education*, pp. 102, 151, 203, 263–264.

BOARDING SCHOOLS. — A term applied to a type of educational institutions in which the pupils have been surrendered by their parents or guardians to the care and supervision of the teachers of the school, and in which they receive not only instruction, but board and lodging. In England, where they have received their greatest development, the large majority of such schools are under private management and range from the great public schools to the private establishments, where only a few pupils are taken. From the fact that such schools are under private management and the pupils are constantly under the care of the teachers, they have afforded important centers for educational experimentation, so that in this respect the boarding schools on the purely educational side do represent a wide variety of types, ranging from the traditional classical schools to the new school (*q.v.*) of the present day (see Experimental Schools). For a long time the boarding schools were a tool for meeting the educational needs of the upper classes, although in their origin most of the early English boarding schools were intended for the education of the poor.

The main line, however, of boarding school growth is a matter of upper class interests. At an early day the problem of the division of labor between the home and some other educational institution demanded attention. We find the range extending from schooling entirely in the hands of members of the family to such complete isolation in boarding schools as led to questioning the advisability of vacations at home. Between these extremes are found the tutor, the day school, boarding for convenience in the neighborhood of a school, the dormitory, and the boarding school proper, in which the headmaster or some representative stands *in loco parentis*. The advocates of these various systems have presented their claims in both practical and theoretical forms. In Ebers' *Uarda* is given an account of schooling away from home for the youth of the better class in Egypt about 1500 B.C. The Book of Daniel tells of an institution connected with the court at Babylon. In Greece the Spartan boy at the age of 7 was taken from his home and placed under charge of assistants to the *pædonomus*, and was maintained at state expense in public barracks. In Plutarch, *Of the Training of Children*, we find the assumption that schooling be done in the home, while Quintilian considers the moral conditions of the home to be such as to make preferable attendance upon a school. The monasteries and courts of the Middle Ages found it necessary to provide places where students might live while they were training for clerical or court life. In a similar way the homes of the master workmen were opened to their apprentices. The utilitarian aspects of the former as well as of the latter forms of the school are sometimes lost sight of. They were all in a very real sense vocational schools. The conditions of the life into which pages or bower maidens were placed called for a training in manners that meant serviceableness as well as courtesy; "it included for these children knowledge how to carve and wait at table, how to serve their lord both at the board and in his chamber; the pouring of water for his hands, the handing of napkins, and how all these things should be done with urbanity and grace." (Godfrey, 84.)

The rise of the universities produced a variant upon the existing forms. The boarding houses in which students congregated (somewhat similar to the "clubs" found near colleges and normal schools to-day) became convenient units for the purposes of both teachers and students. These *hospitia* (*q.v.*) were at first self-governing, and later were reduced to control. In England the colleges were frequently at first places in which poor students could live, but their convenience in school administration and teaching soon led to a change of function and to an inclusion and predominance of well-to-do students. In Germany in the fifteenth century the college or boarding house succeeded the nation as the chief unit of organization. In this connection may be noted some of the recent criticisms of the American College, and also the tendency to the utilization of the fraternity organizations and their clubhouses.

The most distinct form of the boarding school is found in the English public schools (*q.v.*) beginning in Winchester (*q.v.*) (1387) and Eton (*q.v.*) (1440), and becoming well established in the time of John Colet's day school, St. Paul's (1512). In the seventeenth century appeared one of the most potent influences in making these the significant tool which they have become in Anglo-Saxon civilization. This was formulated in the work of John Locke, despite the fact that he was prejudiced in favor of home education, which while accounted by him inconvenient, even under the direction of the tutor, who looms large in his system and in that of Rousseau, yet offered less dangers than were met where the influence of the schoolmates was greater than that of the schoolmasters. He feared the "prevailing infection of his fellows the greater part of the four-and-twenty hours," also the "malapertness, trickery or violence learnt amongst school boys."

A somewhat different type of boarding school is set forth in Milton's *Tractate* (*q.v.*). This had much influence, although at a considerable distance, upon that form of the school called the academy. He is an advocate of travel as a factor in schooling, as is Montaigne. Under another form this need is taken account of by the new schools of Europe in the exchange of students, and by insistence upon residence in foreign schools in order to secure a foundation in other languages than the mother tongue.

In the sixteenth century Mulcaster had carefully discussed the merits of private and public education, and had decided that the "difficulties of upbringing are too serious for all the responsibilities to be thrown into the hands of one alone." (Note the hesitation of the Jesuits to burden themselves with all these cares.)

In Germany in the sixteenth century there emerged the *Fürstenschulen* (*q.v.*), or schools for princes. These were similar to the court schools of Italy, the best known of which was that of Vittorino da Feltre (*q.v.*) at Mantua, 1438. As modern representatives may be taken St. Afra in Meissen (1543), Schulpforta (1543), and Rossleben (1554). The boarding school was found serviceable by Basedow (*q.v.*) in the *Philanthropinum* at Dessau (1774). This was intended to bring together both rich and poor, and as in all the more democratic ventures, there was here strong emphasis upon *Realien* as object lessons, and even forestalling more recent work in manual training. (Note the relations of Francke's work to the establishment of the *Realschule*.) Basedow's influence was wide-reaching, but even more so in many ways was that of Fellenberg (*q.v.*), whose school at Hofwyl (1806–1844) stirred people to new endeavors in education from Russia to America.

The schools of Pestalozzi are too well known to require more than reference in this statement of the general movement. Another boarding school of importance is Keilhau, founded by Froebel in 1817, and still in operation. There is a delightful simplicity in its atmosphere to-day, which recalls the charm of the days spent there by George Ebers and described by him in *The Story of my Life*.

The most definite outcome of the Herbartian movement in this line is the *Stoy'sche Erziehungsanstalt* in Jena (1843). (See Russell's *German Higher Schools*, ch. x.)

In the earlier days of the boarding school we find them termed "closed" schools in distinction from those "open" to day pupils. The name *Internat* is extensively used, and one still finds doors in seminars for the training of teachers marked *Convict*. The verb *internare* from which the former term was derived retained the significance suggested in English by the second term, "to put into jail." It is to France, however, that we must turn to find the extreme forms of seclusion and restraint. This nation has made extensive use of the boarding school in the form of the Lycée of the *internat* type. Much of the seclusion so generally deprecated came from the dominance of the Church, and the opportunity thus given to control the situation sufficiently to make possible withdrawal from supposedly objectionable influences. Yet we find that the society which has left its most definite impress upon French schools, the Jesuits, opened boarding colleges reluctantly. This, however, came about sooner and with less difficulty in the south and in France than in Germany.

The problems of boarding schools for girls have not differed essentially from those for boys. On the one hand, there has been a tendency toward the life of seclusion for a young woman, particularly in troubled times when homes were unsettled and fathers away on public business. The court gathered in its bower maidens to be trained for court life, but the Church has done the larger work. On the other hand, there has always been a stronger tendency to keep the girls within the home circle. Fénelon and many others in various countries have urged education for them at home.

We find the Carow Nunnery near Norwich, England, with boarders from its foundation in 1146. Dartford Nunnery dates from 1355 (see GIRLS, EDUCATION OF). The Reformation closed many nunneries, but was slow to offer a substitute. Excepting the convents, we have little record of schools for girls before the seventeenth century. We find Mrs. Bathsua Makyns in charge of a school at Putney, and others can be traced by means of Pepys' Diary and similar writings of incidental reference. Occasionally a modern girls' school lays emphasis upon training for home duties, but these are apt to be reduced as social advancement and recognition is secured. The old type of "finishing" school is essentially vocational in the sense of preparing for the conventions of society, and this phase is still evident, even though the preparatory function is taking a leading place. This change marks an advance, but there is room for more definite experimentation in the working out of schools for girls which will frankly recognize the home and business activities of women as worthy of study upon a scientific basis. (See BEDALES.) In Japan practical gardening and kitchen classes are included in the courses.

In America conditions had prevented crystallization along older lines, and the main current during the century was public education, and that of the *externat* rather than the *internat* type. The latter, however, for reasons of convenience, has at all times held an important place. From the group of boys collected in the home of a New England clergyman has come in time a boarding school. One type has followed, often at a considerable distance, the

English public school. Another has developed with many important changes from the academy of the Puritans; this is best seen in some of the town academies (*q.v.*) of New England. A third type was seen in the manual labor institutions (*q.v.*) following the lead of Fellenberg. These usually took especial account of the partial or entire self-support by the students found to some extent even to-day in some of the other types and expected to bring about a thorough physical development in connection with it without the sacrifice of scholastic attainments. The Atlantic coast saw many of these institutions rise and fall. Their failure was due, in part, to inability to recognize the far-reaching consequences of their schemes if successful, and the great amount of time needed to make efficient machinery equal to forwarding the task. It is interesting to note in such a school as Hampton how the self-support idea tends to move to the background as academic standards are raised.

When the industrial aspect was thus for the time abandoned, the " return to nature " tendency, with its appreciation of the importance of recognition of the physical nature, led to the establishment of schools in which self-support and productive industry were frankly given up. Especial effort was made to provide more adequate physical training.

The work of Jahn (*q.v.*) and others in Europe had made progress in this direction much less difficult. It is not strange that the military training given to youth in many countries should have led to the adoption of the form of the military school (*q.v.*).

In Adams, *Some Famous American Schools*, will be found a somewhat popular account of nine representative boarding schools, extending from New England to the Pacific Coast. The tendency toward schools of this type has increased with the growth of wealth. Adams states that " where one such institution existed prior to 1865 twenty may be counted now." Among the earlier were Nazareth Academy (1759), Phillips Andover (1778), Phillips Exeter (1781).

It is not strange that social reformers have in all periods planned to use the boarding school to accomplish their purposes. Nazareth Hall in Pennsylvania was founded in 1759, and for a few years exemplified some forms of Moravian Communism. One of the most interesting plans of this kind is that advocated by Lepelletier, a Jacobin, and put forward after his death in 1793 by Robespierre in the Assembly. Among other provisions was the following: " Let us ordain that all children, girls as well as boys, girls from five to eleven, and boys from five to twelve, shall be educated in common, at the expense of the state, and shall receive, for six or seven years, the same education." Similar schemes were advocated by Fourier and others. Goethe's *Pedagogic Province* is much less known than it deserves for its suggestiveness in other school fields as well as that of the boarding school.

The more recent discussions concerning the community care of little children, by Mrs. Charlotte Perkins Gilman and others, also the increasing tendency for the community to take account of the need of more adequate feeding of school children, open up phases of the subject which may well require more adequate consideration before long.

Fichte had called for a complete separation of children from their home (Works, Vol. 3, pp. 406–407). In fact, he seemed to think that by the isolation of children from the society of their day a new start could be made by which we should be freed from many of the defects that now trouble us. This, with his interest in physical welfare and vocation, has been a factor in the development of the Deutsche Landerziehungsheime (*q.v.*). A further application of these ideas to the training of apprentices is suggested in *Grundfragen der Schulorganisation* of Dr. Georg Kerschensteiner (p. 14).

One of the most significant developments during the last quarter of a century in this department of the school has been that chain of schools beginning in Abbotsholme (*q.v.*) in 1888 under Dr. Cecil Reddie, and carried into Germany by Dr. Herman Lietz in the Deutsche Landerziehungsheime (*q.v.*) and into France by M. Edmund Demolins in L'École des Roches (*q.v.*). One of the most important of these schools is the coeducational institution established by J. H. Badley at Bedales (*q.v.*). Others have been established in France, Germany, Switzerland, and Poland. Interlaken at La Porte, Ind., is the American representative. There are in all over 20, for the most part independent of each other and showing remarkable adaptation to national conditions, yet unified by the common attempt to afford to the students opportunities to meet real problems within their range in school organization and life. There is a marked emphasis upon simplicity of life, and in nearly all cases a real interest in outdoor life by means of sports and participation in various forms of productive labor.

The problems of the boarding school are many and complex. By no means least is that of the immoral customs appearing oftentimes in a society of boys of various ages. The fagging system has been at times involved in this. Some headmasters have separated the school into sections according to ages. Discussion of some of the moral problems will be found in Fitch's *Arnold*, p. 77; *Dublin Review*, October, 1878, p. 294; and the preface to the sixth edition of Hughes' *Tom Brown at Rugby*.

There is in the boarding school an opportunity, too little recognized, to accomplish experimental work (see EXPERIMENTAL SCHOOLS). On the whole, however, the men engaged in this work pay too little attention to education outside their fields, and, with a few notable exceptions, as the work of Arnold and Thring, their contribution to educational literature has been much less than the opportunities justify. Especially is there much to be learned concerning a closer relation between the school and other parts of society from these institutions. The isolation from certain aspects of social life has led to a greater development of student societies and other social tools. These are recognized to a greater extent as important factors in training and not merely as difficulties to be controlled or gotten rid of. Dr. Findlay has written much upon the corporate life of the school, and has shown the advantages of making use of the house system and other devices, even for day pupils as at Cardiff. The development of more effective coöperative supervision in secondary schools by means of class teachers, session masters, advisers, social secretaries, etc., has the same end in view. The house system, however, gives a permanence by bringing the student into definite, responsible, social relations with the head of the house throughout his entire course. Perhaps nowhere to-day is this lifelong function so well seen as in the relation of the best type of English head or house master to the "old boys" of the school. The English college tutor and the preceptor in the recent experiment in Princeton make use of the same need.

Apart from the advantages arising from opportunity for intimate, stimulating, and in many cases permanent, relations with men, the main arguments for the boarding school have been the effects upon a boy of a system of customs and traditions on a plane which has meaning to him, and the belief, as Quick puts it, that, "As far as our character depends upon others, it is formed mainly by our companions at every age. Men have not enough in common with boys at every age to be their companions, even when they are never out of their company." These are both seen at their best in England, and have given rise to the prefect system, to fagging, etc.

In many countries the boy is not a part of the household until he is a man. Where initiative is not counted an advantage, the habit formation possibilities of the boarding school are urged. Where citizenship is progressive, there is the further opportunity for an epochal development in the society of his peers. De Quincey says (*Autobiographical Sketches*, Works, Vol. I, p. 150): "At nine or ten the masculine energies of the character are beginning to develop themselves; or, if not, no discipline will better aid in their development than the bracing intercourse of a great classical school. There is not in the universe such an Areopagus of fair play and abhorrence of all crooked ways as an English mob, or one of the time honored English foundation schools." The value of this experience at so early an age is less urged now than formerly. "I think this is a gain where boys can be kept at home, but very much the reverse where they are sent as boarders to private schools. What we stand urgently in need of is good day schools for the younger boys of all classes." (Quick, *Educational Reformers*, p. 117.) There are two marked tendencies in this development. These are well seen in the works from which we get our impressions of the English public school which is best known in America — Rugby under its great headmaster Thomas Arnold. From *Tom Brown at Rugby* by Hughes one gets what is sometimes referred to as the "Spartan" view, while Stanley's *Life of Arnold* gives the "Athenian." The former is deprecated by some who feel that the physical interests are given entirely too much consideration. Another view is that of those who object to the physical training in a formal sense as subversive of adequate development. These problems are coming up for further consideration in Continental and American schools, and also in the summer camp (*q.v.*), that modern device for affording the opportunities of the boarding school for a part of the year.

A critic of the work *A Famous Eton House* (*Quarterly Review*, Vol. 208, pp. 399–416) makes an "attempt to criticize frankly the whole boarding school system from an idealistic point of view." The dangers he sees have as much bearing in other countries as in England. They are "(1) An atmosphere unfavorable to intellectual pursuits. (2) The withdrawal of home influences. (3) The dangers of encouraging and increasing class prejudices." The problems are "how to raise the intellectual tone without inducing a precocious self-consciousness; how to fortify the moral standard without developing a premature and oppressive sense of responsibility; how to direct energy into the right channel without sacrificing the sense of personal liberty; how to govern effectively yet leave the community its conscious independence."

F. A. M.

See ATHLETICS; DORMITORIES; EXPERIMENTAL SCHOOLS; MILITARY SCHOOLS; OUT DOOR SCHOOLS; PUBLIC SCHOOLS, ENGLISH; PRIVATE SCHOOLS; SUMMER CAMPS; and the special articles on the various institutions, ETON, WINCHESTER, etc.

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BOARDS OF CONTROL. — A somewhat general term applied to many kinds of official boards. Ordinarily a Board of Control means a Board of Trustees, or Managers, or Governors, having charge of finances and the management of some public or private institution established for some educational, charitable, or philanthropic purpose, such as a Board of Control for a state university, or an agricultural and mechanical college; a Board of Control for a home for friendless children, or a school for the blind or deaf; or a Board of Control for a fund for the aid of negro schools. Boards of Trustees, Boards of Regents, and Boards of Governors are Boards of Control, and these are the terms commonly used. Sometimes official state boards are *ex officio* Boards of Control for certain state institutions, as, for example, the Massachusetts State Board of Education is *ex officio* a Board of Control for the State Normal Schools of Massachusetts. Any official body which has charge of the administration of a trust, a foundation, or an established institution may be called a Board of Control, though the term is less frequently used than the others given above. E. P. C.

BOARDS OF EDUCATION, CITY. — See City School Administration.

BOARDS OF EDUCATION, COUNTY. — See County Boards of Education.

BOARDS OF EDUCATION, DISTRICT. — See District System of Education.

BOARDS OF EDUCATION, LOCAL. — See City Schools, Local Boards.

BOARDS OF EDUCATION, STATE. — See State Boards of Education.

BOARDS OF EXAMINATION. — See Examination Boards.

BOARD OF SCHOOL LAND AND SCHOOL FUND COMMISSIONERS. — See School Fund, and Commissioners.

BOARDS OF TRUSTEES, DISTRICT. — See District Boards of Trustees.

BOBBIO. — A town situated on the Trebbia, 37 miles northeast of Genoa, famous for its ancient monastery founded by St. Columban about 615. Some of the most important of the earliest Mss. of classical works originated from this monastery. The first catalogue, which was made in the tenth century and was printed by Muratori, contained nearly 700 Mss., and included Terence, Lucretius, Ovid, Virgil, Lucan, Persius, Martial, Juvenal, Claudian, Cicero, Seneca, and the elder Pliny. A second catalogue was made in 1461. The library enjoyed a great reputation during the Renaissance period, and was visited by many of the earlier humanists. Most of the Mss. were dispersed in the sixteenth and seventeenth centuries, and are now located chiefly in the Ambrosian Library in Milan, the Vatican Library in Rome, and the Royal University Library in Turin. Some of the oldest palimpsests belonged to this collection, and were found to contain writings of Cicero, Fronto, Symmachus, and the Theodosian Code. The most famous relic was a Ms. (known as the Muratorian fragment in the Ambrosian Library), containing the earliest extant catalogue of New Testament books, which is probably of eighth-century origin and is a copy of an older Ms. of the second century.

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BOCCACCIO (1313–1375). — Next to Dante and Petrarch the most important of the Italian writers immediately preceding and influencing the Renaissance. Apart from his position as a remarkable prose writer and the founder of the Italian novel, Boccaccio played an important part in the restoration of classical studies. A mixture of skepticism and superstition, Boccaccio allowed himself to be terrified into a conversion in 1361, but although he gave up literature of the type of the *Decameron,* his love for the ancient classics did not wane nor his studies and researches relax. Like Petrarch, he hoped for immortality through his Latin works, but though these hopes were not fully realized, he contributed largely to the awakening which soon followed. Many valuable Mss. owe their preservation and discovery to him. He made a copy, still preserved in the Laurentian Library, of all the writings of Terence; he was the first to quote Varro; he was the earliest of the humanists to study Tacitus. Influenced by Petrarch, Boccaccio was the first modern scholar in Europe to study Greek; that he did not learn much was due rather to the ignorance of his teacher, Leontius Pilatus, whom he kept for three years in his home in Florence. With his assistance he managed to give to Europe the first modern translation of Homer into Latin. He seems to have read something of Plato and of Aristotle. His Latin writings are numerous; the majority are based on ancient sources: *On Famous Women, On the Falls of Princes, On the Genealogy of the Gods,* a book of mythology, *On Mountains, Woods and Waters,* a reference handbook to the geographical names in ancient literature. For the future of the revival of classical study Boccaccio's defense of pagan poetry through an allegorical interpretation was an important factor in disarming the opposition of the Church. At his death Boccaccio was in the possession of 106 Mss. of classical works. He was, indeed, as Symonds said of him, "a painstaking pioneer of antiquarian research."

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BODLEIAN LIBRARY. — The first public library in Europe, founded at Oxford in 1597, through the gift of Sir Thomas Bodley (1545–1613). A library had already existed at Oxford through the benefaction of Duke Humphrey of Gloucester, but this had been destroyed in Edward VI's reign. Thus the foundation of 1597, the year in which Bodley conveyed his offer to the Vice-Chancellor, was in reality a restoration. Bodley was a graduate of Oxford and a scholar of repute. He had introduced the study of Greek into his college, and was a well-known Hebrew student. He spent several years in the diplomatic service. A marriage with a wealthy widow enabled him to carry out his project. He himself presented a large number of books to the library, and engaged a bookseller to make purchases on the Continent. In addition he induced his friends to make similar gifts to the library, and their example was followed in all parts of England. The library was officially opened in 1603, and received its charter and name, Bodleian Library, in 1604. In 1610 the Stationers' Company agreed to present the library with a copy of every book which appeared. In 1611 Bodley gave the library a permanent endowment, and at his death in 1613 left the greater part of his wealth to it. From time to time the library has received valuable gifts. Thus Archbishop Laud presented it with 1300 Mss. in different languages. Valuable additions were obtained by purchase. The strength of the library is in its collection of Oriental, Greek, Latin, and Hebrew Mss., and material for British history and literature. A collection of marbles and portraits is also included. The more general and common books are now located in the Radcliffe Camera, which is used as a reading room.

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BODY AND MIND. — This subject has been discussed by writers on both philosophy and psychology. The former have been interested in the question of the relation of mind to the material universe, and may be roughly divided into materialists, who hold that mental processes are to be explained as manifestations of bodily activity, and into spiritualists, who hold that all true reality is mental rather than physical in character. Intermediate forms of these theories and the various compromises between them have constituted the major subject matter of philosophical discussion.

Psychologists have been interested in the relation between body and mind in their efforts to explain the origin of sensations and the relation between conscious processes and bodily activities. One group of writers has held that there is a causal relation between mind and body, that the physical processes which take place in the nervous system are the causes of mental processes and that conscious processes are in turn the causes of motor activities. The difficulty with this causal view of the relation between mind and body is that it introduces into the conception of the universe an element which does not seem to comport with the doctrine of the conservation of energy. The physical sciences through which the doctrine of the conservation of energy has been established recognize the transformation of energy from one form into another. Thus, light may be transformed into heat, and heat may be transformed into motion. Throughout all these transformations, however, there is an uninterrupted, quantitative equivalence and a fundamental similarity in character. When now the nervous processes that arise in one of the organs of sense are supposed to be carried to the central nervous system and from this point to be carried back down along a motor nerve to a muscle, there seems to be no easy formula whereby consciousness can be included in the descriptive series. If the nervous energy is even for a single moment transformed into consciousness, it would seem to lose its character as a physical force, and thus the principle of the conservation of energy would be violated. Because of these difficulties in maintaining a causal relation between mind and body, a general formula has been very commonly used in current psychological writing which evades the difficulty. This principle is known as the principle of psychophysical parallelism.

According to this doctrine, physical processes are not in any wise interrupted by mental processes. The physical series has a causal character entirely in keeping with the principle of conservation of energy. Mental processes on the other hand unite in an independent parallel series. Mental processes constitute a cycle of causal relations in no wise interrupting the cycle of physical relations. This doctrine of psychophysical parallelism has been widely accepted as the simplest solution for the purposes of psychology of the difficult problem of the relation of mind and body. One who is at work on a problem which deals with sensations must assume a relation between mind and body, but since he cannot assume the validity of causal relations without involving himself in protracted discussions, he may be satisfied with a recognition of mere parallelism, which serves his temporary purposes without in any wise committing him to any of the radical philosophical positions.

See Nervous System.

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BODY, CARE OF THE. — See Hygiene, Personal.

BOETHIUS, ANCIUS MANLIUS SEVERINUS. — Born about 480 A.D. and executed by Theodoric the Ostrogoth in 525. Gibbon says of Boethius, that he was "the last of the Romans whom Cato or Tully could have acknowledged for their countryman." At the same time, he stands at the opening of the Middle Ages, and summarizes for that period the learning of the past. Boethius was a favorite counsellor of Theodoric, and assisted in interpreting the classic past to its Teutonic conquerors, politically as well as intellectually. He was a man of great influence, was elected to the consulship in 510, and later saw his two sons attain the same height, chosen at the same time. Later, however, he was unjustly accused of conspiring against the King to restore the ancient Roman government, and was imprisoned and executed. During his imprisonment he wrote his *Consolations of Philosophy*, one of the most widely circulated and frequently published books of all times. It summarizes the pagan ethics, and gave to the Middle Ages its best account of the ancient philosophy. So thoroughly did its spirit harmonize with the teachings of Christianity that during the ages in which it was a great favorite the *Consolations* came to be regarded as a Christian work and its author as a Christian martyr. As the opposition to the Arian heresy, with which views Theodoric sympathized, gave occasion for the false charges against Boethius, the legend of martyrdom early found credence. Though it is yet a disputed point whether Boethius had any connection with the Christians (certainly none is shown in the *Consolations*), he soon came to be regarded as one of the great Christian teachers, and his writings acquired authority other than that of their own merit.

But a greater influence was exerted by Boethius through his summaries of the logical work and the scientific knowledge of the ancients than through his *Consolations*. As the latter interpreted the ethics of the ancient world to the medieval, so his other works interpreted their learning. The most important of these were his summaries of Aristotle. He translated into Latin the first and second *Analytics*, the *Sophistici Elenchi*, the *Topica*, and the *De Interpretatione*, though the first three of these were seemingly unknown until the twelfth century. He wrote extensive commentaries on the *De Interpretatione* and the *Categories* of Aristotle, also on Porphyry's *Isagoge*, and on Cicero's *Topica*.

It is from these sources that the Middle Ages had their knowledge of Plato and Aristotle until the direct translation of the latter's work in the thirteenth century. Boethius also composed treatises on dialectic and on music, and wrote a compendium of the other liberal arts. In his own day Cassiodorus wrote of him: "Through your translations the music of Pythagoras and the astronomy of Ptolemus are read by the Italians; the arithmetic of Nicomachus and the geometry of Euclid are heard by the Westerners; the theology of Plato and the logic of Aristotle dispute in the language of Quintilian; the mechanical Archimedes also you have restored in a Latin dress to the Sicilians, and whatever discipline or arts fertile Greece has produced through the efforts of individual men, Rome has revived in her own language through your single instrumentality."

These services indeed were performed not only for his own but for six succeeding centuries, during which Boethius was recognized as the great educational authority. And indeed his work continued to be used as the text in music in the English universities until recent times. From his logical writings the great struggle between the nominalists and the realists of the Middle Ages took rise, and from it the combatants of both sides drew their materials or at least got their fundamental ideas.

Boethius helped materially to give permanent form to the seven liberal arts (*q. v.*).

See Arithmetic, History of.

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BOIS, JOHN (1561–1644). — A Greek scholar who was Fellow of St. John's College, Cambridge, and Greek lecturer 1584–1595. The father of John Bois, William Bois, was brought up at school at Halifax, and "according to the custom of the time and place, instructed in music and singing. His mother, Mirabel Bois, had read the Bible over twelve times and the *Book of Martyrs* twice, besides other books not a few." Between the years five and six, it is said John Bois could read the Hebrew Bible and write the Hebrew characters "elegantly." His father instructed him in Greek. It is said that when John Bois entered the University of Cambridge at St. John's College, only one other student there could write Greek. "In so short a time afterwards came that general perfection, which would have made the Grecians blush." In five weeks, it is stated, Bois was so well prepared that he was able to get himself in touch with lectures only usually reached after three years' residence. "He was a most exact grammarian, having read near sixty grammars, Latin, Greek, Hebrew, Syriac, etc." Bois was one of the translators of the Authorized Version of the Bible (1604–1611). The "Company" to which he was admitted held their sittings at Cambridge, over the translation of the Apocrypha, and of Bois his biographer (Harleian Ms. 7053, printed in Peck's *Desid. Curiosa,* Vol. II, p. 326 et seq.) stated that he worked all the week at his post, as well as discharged his cure on Sunday, and took up the part assigned to another. "Four years he spent in this service . . . and then a new choice was made, of 6 of the 47 translators, to review the whole work. Bois and the Cambridge Professor of Greek, Andrew Downes (*q.v.*), were two, and with the others went to Stationers' Hall, and in three quarters of a year fulfilled their task. All which time they received duly 30 shillings each of them by the week, — from the Company of Stationers, though before they had nothing." Bois also contributed to another great undertaking, the preparation of notes to the Greek text of St. Chrysostom. Both the Greek professor, Andrew Downes, and John Bois prepared notes for Savile's wonderful edition of St. Chrysostom published at Eton in 8 folio volumes in 1610–1613. Dr. Thomas Baker stated that Bois' notes were incorporated in the Benedictine (1636) Paris edition of St. Chrysostom's work, whilst those of his teacher Downes were omitted. Bois published a treatise on Greek Accents in 1630, and his critical notes on passages in the Greek Testament were issued in 1655. F. W.

BOLIVIA, EDUCATION IN. — Bolivia Republic: area, 605,400 square miles; population, 1,953,916 (estimated, 1906). Of this number about 50 per cent are Indians and 27 per cent métis; the white population, about 14 per cent; remainder negro and unclassified. Capital, Sucre; population, 67,235.

Public instruction is represented in the central government of Bolivia by a ministry combined at present with that of justice. The political divisions form a graded series of which the municipalities represent the final unit. The various divisions are administered by prefects, subprefects, etc., all appointed by the president of the republic, a plan which affords, as it were, a guarantee of political solidarity. The system of public instruction comprises primary schools and secondary and higher institutions. The primary schools are under the direct control of the municipal authorities. Secondary and higher education forms a united system administered through a university organization, resembling that of France.

While the system of public instruction has a somewhat elaborate official organization, the political and industrial conditions of the country have precluded its practical development, and education is almost entirely under the control of the Church and the religious orders. According to the latest official statistics (1906), there were 710 primary schools, with 1126 teachers and

48,560 pupils. Outside of the cities the instruction is of the most elementary character, and even in the cities the primary schools have a very limited range, as children of the better classes enter the secondary schools at an early age. The public expenditure, government and municipal, for primary education amounts to about 550,000 bolivianos annually, equivalent to $214,000, United States currency. The official regulations governing admission to the higher institutions, and the requirements for professional diplomas, determine the scope of secondary education, which is specially extended on the literary side. In 1906 there were reported 8 public colleges, 5 clerical establishments, and 5 private *lyceos*, with 126 teachers and 2530 students.

In addition to the secondary schools for liberal culture, there are schools of arts and trade, and schools of commerce, maintained at La Paz, Sucre, and at the departmental capitals. The training of teachers is a subject that receives much attention in Bolivia, and the city of Sucre can boast a well-organized normal school whose director, Dr. G. Rouma, is recognized as a leader in those researches which are giving scientific precision to the methods of modern education.

There is no organized university in Bolivia, but nearly every civil department is provided with schools of law, medicine, and theology. The standards of professional training and of the diplomas that entitle the holders to practice the liberal and technical professions are high.

A. T. S.

BOLOGNA, UNIVERSITY OF. — One of the earliest institutions of higher learning in Europe, whose history can be definitely traced back to a period before that of Irnerius (*q.v.*), under whose influence it gained a European reputation. The earliest legal charter was given to the university in 1158 by Emperor Frederick Barbarossa, which, however, contains nothing more than an official recognition of the scholars, and grants them some privileges. The early history of the University of Bologna is the early history of the universities (*q.v.*). It was here very largely that an organization was evolved which served as a model for numerous other institutions. The earliest statutes, which are now in part available, date from 1317. The faculty of law was the earliest and most famous. Faculties of medicine and arts were added. A faculty of theology existed, but never attained much popularity. Women were admitted not only as students, but as instructors and professors, as early as the beginning of the eighteenth century. The university has been reorganized in the last century. Faculties of arts, sciences, law, and medicine are maintained, as well as schools of agriculture, pharmacy, and veterinary medicine. In 1909 there was an enrollment of about 2000 students. See CANON LAW; ITALY, EDUCATION IN; UNIVERSITIES.

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BOLTON, or BOULTON, EDMUND. — An English poet and historian, who in James I's reign proposed a scheme for an academy of letters and science which in 1620 was referred to a Committee of the House of Lords on the motion of Lord Admiral Buckingham. The idea of an academy (*q.v.*) was in the air. Prince Henry (son of James I) had supported such an institution, in which all the King's wards and others should be educated in England, without the necessity of going abroad to complete their training. (Cf. Sir Humphrey Gilbert's *Queen Elizabeth's Academy.*) But Prince Henry died in 1618. The project was also in Lord Bacon's mind. James I seems to have proceeded so far as to grant a seal, badge, and escutcheons for the members of the academy. The College was to be in or near London. "Finally His Majesty . . . graciously added that the censure of all books, which handled not things divine, should belong to the officers." (See on this and other projects for academies, Oxford Hist. Society, *Collectanea*, 1st Series, Part VI, Dr. Wallis's Letter, article by T. W. Jackson, pp. 269–307.) In 1629 Bolton wrote the *Cities Advocate*, justifying the importance of apprenticeship, and showing that in the past youths of good family had been "apprentices," and arguing that apprenticeship did not extinguish the "claims to gentry." This is significant, as showing the decadence of the old idea of apprenticeship by Charles I's reign.

F. W.

BOMBAY, UNIVERSITY OF. — Organized in 1857, and reconstituted in 1904 under the India Universities Act. It is an examining body, consisting of a Syndicate in the faculties of arts, law, medicine, and engineering. The teaching colleges organized under this university are Elphinstone, Wilson, St. Xavier's, Grand Medical, and Sir Jamsetji Jijibho y Zarthoshti Madrassa, the last for Parsee students.

See BRITISH INDIA EDUCATION IN.

BONAVENTURA, or JOHN OF FIDANZA. — Born at Bagnarea in Italy in 1221, and died while in attendance at the Council of Lyons in 1274. In 1242 he entered the order of the Franciscan friars, and afterwards studied at the University of Paris, where in 1253 he became a teacher and in 1255 doctor. His sobriquet "seraphical" is no better witness to his fame than the fact that in 1256 he became principal of the Order of St. Francis, and might have been, had he wished it, Archbishop of York. One finds him persecuting the eminent and liberal-minded Roger Bacon, helping to elect Pope Gregory X, and being appointed a cardinal and Bishop of Albano. His works include

Sermons, *Lives of the Saints*, expositions of the Scriptures, and of the *Book of Sentences*. Bonaventura was a realist, and somewhat of a mystic, the latter tendency being beautifully expressed in his *Itinerary of the Soul to God*. "In brother Bonaventura," said Alexander of Hales, "the sin of Adam does not seem to have had place."

BOND, JOHN (1550–1612). — An English scholar and teacher, described by Anthony à Wood as " a most noted critic in Greek and Latin learning," is an instance of the times when a man could easily change from one learned profession to another, or indeed practice both. He was born at a village (Trull) 2 miles from Taunton in Somersetshire (England), educated at Winchester College, and from thence passed to New College, Oxford, where he was one of the " clerks." He took his degree about 1575. About 1579 he became master of the Free (Grammar) School of Taunton, a post conferred upon him by his Oxford college. The rest of his story is best given in the words of Anthony à Wood (*Athen. Oxon.*, ed., 1815, Vol. II, col. 115). "At which place continuing many years, he did exercise such an admirable way of teaching, that many departed thence so excellently well grounded in humane learning, that they proved afterwards eminent either in church or state. At length, being in a manner worn out with the drudgery of a school, he did for diversion, I cannot say profit, practice physic, though he has taken no degree in that faculty in this (Oxford) University, and became at length eminent therein." As for his writings, they "are used by the juniors of our universities, and in many Free Schools, and are more admired and printed beyond the seas than in England." The classical works edited by John Bond were: (1) *Quinti Horatii Flacci Poemata, scholiis sive annotationibus, quae brevis Commentarii vice esse possint, illustrata*, Lond., 1606 (with editions published also at Leyden, Frankfort, Hanover, Amsterdam, Leipzig). The British Museum Library contains 17 different editions. (2) *Auli Persii Flacci Satyrae sex, cum posthumis Commentariis Johannis Bond*, London, 1614 (editions also published at Paris, Amsterdam, Nuremberg). Of John Bond's notes on Horace, John Brinsley in his *Ludus Literarius* says: " He hath by his brains made that difficult Poet so easy that a very child which hath him well entered and hath read the former school authors in any good manner, may go thorough [*i.e.* through] it with facility, except in very few places." F. W.

BONDED INDEBTEDNESS FOR SCHOOLS. — Indebtedness incurred for the purchase of sites, and for the erection and repair of school buildings. Compared with other forms of indebtedness, this is small in amount, but it has increased faster than either the municipal or the state debt during the past two decades. This is due to the new interest in providing school buildings of the best type, which has called for a large outlay of money.

The usual form of this indebtedness is serial bonds, running for from 10 to 20 years, a certain proportion of the bonds being retired each year after their issue. Sometimes, in cities, the issue is for more than 20 years, but in rural districts 10 years is the common period. The school laws of the different states provide in detail for the bonding of school districts, and for the collection of taxes to provide for the interest and the gradual retirement of the bonds.

In rural districts, towns, and small cities, and not infrequently in large cities also, all such bonds are issued only after the question of bonding the school district has been submitted to the voters, and authorized by them by a two thirds majority vote. In a few of the Eastern states, the voters, assembled in annual or special school meeting, may vote to bond the district for building purposes. In large cities, particularly in the East, a general vote is not required, the bonds being issued by the city council on the request of the school authorities. E. P. C.

BONIFACE, ST., or **WINFRID.** — The apostle of Germany, as he was known, was born at Crediton in 675, and after an education at Exeter and Nursling, became a missionary in Thuringia and Friesland. His mission among the Saxons and Hessians was fraught with the greatest danger, but also the greatest success. In 723 he became a bishop, and in 745 Archbishop of Mainz. The great monastery of Fulda, for long the home of the highest learning in Germany, was erected with his approval in 744. Boniface himself wrote textbooks on meter and on grammar, founded on the classical originals of Charisius, Diomedes, and Donatus, together with sermons, letters, and moral acrostic poems, typical of the spirit of the day and its inferior Latin and scholarship. According to the standards of his day, however, Boniface was a purist in literature and an ardent friend of education. One finds him asking an abbess for a copy of St. Peter's Epistles in letters of gold, and writing to England for books. Boniface resigned his high ecclesiastical preferment in 753, to return to Friesland, where in 754 he met the death of a martyr, his body being taken for burial to the monastery of Fulda. P. R. C.

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BONITZ, HERMANN (1814-1888). — A prominent German schoolman and classical philologist. He was born in Langensalza, and received his secondary education at the famous school in Pforta, then studied philology at the University of Leipzig under Gottfried Hermann, and in Berlin under Böckh and Lachmann. In 1836 he became a teacher at the Blochmann Institute in Dresden, and in 1838 he received a position at the Friedrich-Werder Gymnasium in Berlin. In 1848 he was called as professor of classical philology to the University of Vienna, with the special view of assisting Exner in the reorganization of the Austrian secondary school system. The two men worked out the famous *Organisationsentwurf* (*Plan of Organization*), "the Magna Charta of Austrian secondary schools," which inaugurated a new era in the history of higher education in Austria. The *Organisationsentwurf* was promulgated by the Minister of Education, Count Leo Thun, in 1849, and in its main outlines is still in force at the present day. It contained instructions for the teaching of the various subjects, most of which were written by Bonitz. These instructions are permeated by the Herbartian spirit, and are full of the finest pedagogical insight. In the philological seminary which he conducted in the university, he trained capable teachers for the newly reformed higher schools, and through the *Zeitschrift für die österreichischen Gymnasien* (*Journal for the Austrian Gymnasiums*), which he edited for 17 years, he infused life and activity throughout the whole body of Austrian secondary teachers, and defended the work of reform against the attacks of the reactionary parties. In 1867 he accepted an appointment as director of the "Graue Kloster" Gymnasium in Berlin, and in 1875 he became a councilor in the Ministry of Education, a position in which he was very influential, and which he filled almost up to the time of his death. Although a classical philologist himself, Bonitz maintained that the time was past when the classical languages were destined to perform the exclusive, or even the leading, part in higher education. His published writings are chiefly studies of the Greek classics, especially of Plato and Aristotle, with whose philosophies he had a profound acquaintance.

F. M.

BONN, THE RHENISH FREDERICK WILLIAM UNIVERSITY OF. — Founded by King Frederick William III of Prussia in 1818, being, with the exception of the University of Munich, the youngest in the German Empire. In spite of its youth, it is the fourth largest institution of higher learning in the country, Berlin, Munich, and Leipzig alone exceeding it in enrollment. The Elector Maximilian Frederick founded an academy at Bonn in 1777, which in 1784 was transformed into an institution of university rank; but ten years later the French occupied the city, and the institution was disorganized. The final establishment of the university in 1818 reflects the political conditions of the time, inasmuch as the institution was intended to constitute the center for higher education in the new western districts of Prussia after the war of the liberation. The university to-day includes faculties of Protestant and Catholic theology, law, medicine, and philosophy, there being about four times as many students of Catholic as of Protestant divinity. An agricultural school is associated with the university. The library contains 325,000 volumes and almost 1500 manuscripts, while the annual expenditures amount to approximately $400,000. Among prominent faculty members may be mentioned Niebuhr, Welcker, Brandis, Ritschl, Diez, Ernst Moritz Arndt, A. W. von Schlegel, Helmholtz (1855-1858), Karl Simrock, and Dahlmann. A number of German princes, including the present Emperor and the Crown Prince, and Emperor Frederick III, studied at Bonn. During the winter semester of 1909-1910, there were in attendance 3598 students, distributed as follows: Theology 403, law 807, medicine 370, and philosophy 2018. In addition there were 282 auditors enrolled.

R. T.

BONNET, CHARLES (1720-1793). — An eminent Swiss naturalist and psychologist. Appointed at the age of 20 a corresponding member of the French Academy. In 1742 he discovered the method of the respiration of caterpillars and butterflies. The failure of his eyesight led him to substitute the study of the reflective sciences for that of experimental science. He adhered to the doctrine of the empirical origin of knowledge through the senses, and the dependence of mental life on the nervous organism, but he believed in the immortality of the soul, and held a metaphysical theory, based on Leibnitz, of the organic unfolding of the countless germs of which the universe is composed, in regular and continuous order, through successive stages. He is accordingly counted among the precursors of Lamarck and Darwin.

His works include, *Traité d'Insectologie*, 1745; a *Traité de l'usage des feuilles*, 1754; an *Essai de psychologie*, 1754; *Essai analytique sur les facultés de l'âme*, 1760; *Contemplation de la Nature*, 1764-1765; *La palingénésie philosophique*, 1769.

S. W.

BOOKKEEPING, INSTRUCTION IN. — See ACCOUNTANCY EDUCATION; COMMERCIAL EDUCATION.

BOPP, FRANZ (1791-1867.) — A German scholar who was the founder of the comparative study of language. Born at Mainz, he studied for about 3 years at Paris, when he had an opportunity of learning Arabic and Persian. Through the medium of grammars and translations he taught himself Sanskrit. In 1821 he became an extraordinary professor in Berlin, and full professor in 1835. His most important work, *Comparative Grammar* (1833), aimed at an explanation of the grammatical forms of the Indo-Germanic languages. Like most pioneers in the field of knowledge, Bopp was discredited, and it remained for his successors to secure recognition for the study of philology.

BORDEAUX, UNIVERSITY OF. — Founded in 1441 by papal bull on the petition of the representatives of the English King and the municipality. A *studium generale* was established, though little work was done in medicine. The university had no endowment, with the result that at times professors could not be obtained to lecture. Under Louis XIII, the right of giving the doctorate was taken away from the university for a time. The decline of Bordeaux was even more rapid than that of the other French universities, until it was suppressed in 1793. Early in the nineteenth century a faculty of letters and sciences was established at Bordeaux, to which were added in 1870 a faculty of law and in 1878 a faculty of medicine and pharmacy. The 4 faculties mentioned are now maintained. There were enrolled in 1909 2780 students, of whom 984 were in law, 1121 in medicine, 319 in sciences, and 316 in letters. See France, Education in; Universities.

BORGO, LUCAS DI. — See Paciuolo.

BOROUGH ROAD TRAINING COLLEGE, LONDON, ENGLAND. — One of the earliest English normal schools for the training of teachers for the elementary schools. It was the original school where Lancaster (*q.v.*) began to put into practice his monitorial system, probably in 1798. In 1812 the school was handed over to the committee which developed later into the British and Foreign Bible Society (*q.v.*), in whose control the school has remained up to the present. In the early years boys and young men from all parts of the United Kingdom, Europe, and other parts of the world were trained. A practicing school, which the superintendents endeavored to maintain as a progressive model school, was associated with the institution from the first. The monitorial system was retained until 1847, when the pupil-teacher system was adopted, accompanied by a government grant. The effect of this financial assistance was an almost immediate extension of the school. Grants were also paid in aid of trained Queen's scholars. The institution was further enlarged in 1871–1872. In 1888 the college was removed to Isleworth, a few miles west of London; the old practicing school which had been in existence for 90 years at Borough Road was closed, and local schools were used for practice teaching. Throughout its career the Borough Road Training College has, like the society which controls it, stood for undenominationalism. In 1908–1909 there were enrolled Episcopalians, Congregationalists, Methodists, Baptists, Unitarians, Roman Catholics, and Mohammedans. The enrollment is about 145. On the general relation of the college to the English system of training teachers, see the article on Training of Teachers.

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BOSCOBEL COLLEGE, NASHVILLE, TENN. — An institution for the education of young women. Kindergarten, intermediate, academic, and musical departments are maintained.

BOSNIA AND HERZEGOVINA, EDUCATION IN. — Bosnia and Herzegovina are under the sovereignty of Austria-Hungary. Laws enacted by the provincial government (*Landesregierung*) must be sanctioned by the Austro-Hungarian government. The administration of schools is vested in a provincial ministry of instruction. Area: 19,702 square miles. Population: 1,568,092 (1905).

Historical. — The schools of Bosnia and Herzegovina have for several centuries been divided into 3 fairly distinct classes. First, those maintained by the Croats, who are adherents of the Roman Catholic Church; second, those maintained by the Serbs, who are adherents of the Greek Orthodox Church; and, third, those of the Turks, who are followers of Mohammed.

The provinces were subject to Turkey from 1503 to 1882, and during this period, while each nationality maintained its own schools, no uniform system existed, and, excepting as regards a few Turkish schools, the State gave no support to education.

Previous to 1882 the schools maintained by the Turks were chiefly for religious instruction. In the mosque schools (*sibian mekteb*) children were taught to read, to recite in Arabic some verses from the Koran, and to write in Turkish characters. There were also religious schools (*médressé*), of a high grade. The number of religious schools in Bosnia (1882) was 719. Secular schools (18) were maintained at public expense, and provided elementary instruction in those subjects usually taught in public or national schools. In addition; there were a Turkish normal school, a military school, and a technical school, all of secondary grade and supported by the State.

Franciscan monks and nuns of the order of St. Francis conducted schools for children of the Catholic faith. They were taught reading, writing of the Serbo-Croatian language in Latin characters, arithmetic, geography, and the Roman Catholic catechism.

Serb schools for those of the Orthodox Greek Church gave instruction in reading (Serbo-Croatia printed in Cyrillic character), writing, and arithmetic. These schools, which were maintained by gifts and by taxes of the communicants, numbered over 100 in 1882, with about 3400 pupils. As a rule they admitted only children of the Serbs belonging to the Orthodox Greek faith.

The revolution of 1875 resulted in the Austro-Hungarian sovereignty of Bosnia and Herzegovina (1882), and in the readjustments that followed education was brought under government direction. The transition was marked by the passage of a law making primary instruction obligatory in both provinces. State control of schools has been assumed gradually by extending aid to existing schools and by opening new schools. In the case of aided schools the State reserves the right to assist in the nomination of teachers, and, in some cases, to prescribe the course of study. The law specifies that all instruction shall be given in the Serbo-Croatian language.

Primary Schools. — There are now four classes of primary schools: The national schools, consisting of those which have been opened recently by the government, and reorganized religious schools; Turkish confessional schools, of which 58 have been brought into conformity with state regulations; Catholic schools; and schools of the Orthodox Greek confession similar in character to the national schools. The number of schools in the first two classes in 1907 was 1063, and in the last two was 98. The subjects of instruction in the national schools correspond to those for the elementary schools of Austria-Hungary. Much attention, however, is given to agriculture. Eleven higher primary schools for girls are maintained, and a normal school for the training of teachers, located at Sarajevo. The secondary schools for boys consist of 5 gymnasia and 1 realschule. There are also 9 lower commercial schools, a Greek oriental school, and a Catholic seminary for priests of the respective denominations. L. D. A.

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BOSSUET, JACQUES BÉNIGNE. — French prelate and orator, born at Dijon, Sept. 27, 1627; educated at the Jesuit College of Dijon and the University of Paris, College of Navarre; promoted to the priesthood and obtained his doctorate in 1652, and established as priest in Metz. He removed to Paris in 1659, and at once gained a reputation for eloquence, and was in great demand as a preacher for special occasions. In the year 1669 he was appointed Bishop of Condom, and in 1670 he was chosen by Louis XIV as preceptor of the Dauphin. For 10 years he devoted himself to his appointed task, but with indifferent success. The prince lacked ability, and the aim was too high for the mark. The pedagogical plan was imposing, and the range of studies comprehensive. Bossuet himself assumed immediate direction of the instruction in ancient languages, in history, and in philosophy. He composed his *Discours sur l'histoire universelle*, a logic, and a treatise upon the *Knowledge of God and of One's Self*, for the benefit of his pupil. He undertook to fashion the character, develop the judgment, and refine the mind of his pupil, while preparing him for his future profession as king.

Bossuet was appointed Bishop of Meaux in 1681. His scholarship and his eloquence made him the actual leader of the clergy in France. He was almost constantly engaged in some form of religious controversy. He defended the liberty of the Gallican Church, but he ardently opposed the Protestants. His attacks upon the Quietistic heresy led him into a bitter conflict with Fénelon, which resulted in the condemnation of the latter. His long life was intensely active throughout. His death occurred Apr. 12, 1704. S. W.

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BOSTON, CITY OF. — The largest city and the capital of the state of Massachusetts, and the chief commercial city of New England. Incorporated as a city in 1822. In 1900 the total population of the city was 560,892, and its estimated population in 1909 was 622,970. Its school census, 5–15 years of age, was 104,150 in 1909, and its total school enrollment was 111,450 in day schools, and 21,409 in night schools. The enrollment in private and parochial schools was 16,563 additional. Of the total population in 1900, 35 per cent were foreign born, and 2 per cent colored. Of the foreign-born population in 1900, 35 per cent were Irish, 25 per cent Canadians, 8 per cent Russians, 7 per cent Italians, and 5 per cent Germans.

History. — On Apr. 13, 1635, the beginnings of the public school system of Boston were made by the passage of the following order by the freemen of the town: "Likewise, it was then generally agreed upon, that our brother Philemon Purmont shall be entreated to become school-master for the teaching and nurturing of children with us." The school thus set up has maintained a continuous existence up to the present, and has long been known as the Boston Public Latin School. Its chief function, from the first, has been to prepare boys for entrance to Harvard College. In 1641 the income from Deer Island was set aside for the support of schools, and in 1660 the General Court of Massachusetts gave Boston 1000 acres of land for the same purpose. By 1682 the school established in 1635 had become so crowded that two others were established, "to teach children to write and to cipher." These two schools really mark the beginning of general education in Boston. These, and others established later, became the so-called Grammar Schools of Boston, wherein masters taught reading, spelling, grammar, geography, and the "higher branches." Boys under 7 years of age were not admitted to them, and children over 7 only if they "could read the English language by spelling the same." Girls were not admitted at all until 1789, and from 1789 to 1828 they were admitted only between Apr. 20 and Oct. 20. In 1828 girls were finally admitted to the grammar schools on the same terms as boys. In 1830, the process of segregating the sexes was begun.

For more than half a century the schools were under the control of the selectmen of the town, the clergy being invited to visit them and to report. In 1789 they were put under the control of a board composed of the selectmen and 12 additional committeemen, elected annually by the town meeting. On the incorporation of the city of Boston in 1822, this board was displaced, and the control of the schools was given to the 8 aldermen of the new city. In 1835 this was again changed, and the control of the schools was given to a School Committee, consisting of 2 persons elected annually from each of the 12 wards, with the Mayor, and the President of the Common Council, *ex officio*, as additional members.

In 1818 the town appropriated $5000 for Primary Schools, and directed the School Committee to elect annually a certain number of persons in each ward to manage its expenditure. The general School Committee appointed what was virtually a subcommittee, consisting of 3 citizens from each of the 12 wards, constituted them a Primary School Committee, and assigned to them the task of providing primary schools. These schools were to be taught by women all the year round, were to admit children as early as 4 years of age, and were to prepare them for admission to the grammar schools. Primary schools were accordingly opened in 1819, and this primary board, by the institution of new schools and the addition of territory, rose so rapidly in importance and in numbers, that by 1849 it had increased from 36 to 190 members, and Boston had, in effect, two school committees, one for grammar schools and one for primary schools. This condition continued until 1854, when the Primary School Committee was abolished, the schools consolidated, and a new school committee took charge of the schools. This new committee consisted of the Mayor and the President of the Common Council, *ex officio*, and of 6 members from each of the 12 wards, one third to be elected annually, and to hold office for 3 years each. The organization of the schools into districts, and the board into district committees, soon followed. By 1875 this board, by the annexation of territory, had increased in number from 72 to 116, and was then displaced by a board of 24, elected at large and for 3-year terms, and with the Mayor and the Chairman of the Council as *ex officio* members. In 1851 the election of a Superintendent of City Schools was authorized by law. In 1876 the appointment of a board of 6 assistant superintendents was authorized. Since that time the progress of the schools has been rapid. In 1901 a Schoolhouse Department was established by law, to consist of 3 salaried Commissioners, who have charge of all school buildings and repairs. In 1905 the School Commission was entirely reorganized by law and reduced to 5 members, elected at large and for 3-year terms, not more than 2 going out of office at any one time. In 1906 further legislation gave a modern business organization to the system, with authority and responsibility properly placed.

In 1821 a new high school for boys, known as the English High School, was organized for the benefit of those not intending to go to college. This is usually regarded as the first public high school in America. In 1852 a normal school for girls was established, in which a 2-years' course of training was offered, designed to prepare girls to become teachers in the public schools of Boston. In 1855 a third year of instruction was added, and the school was made into a girls' high school as well as a normal school. In 1872 the school was divided into two schools, — a High School for girls, and Normal School for girls. By the annexation of adjacent territory, and by the establishment of new high schools, the city now maintains 14 high schools, 7 of which are coeducational. The Mechanic Arts High School, established in 1889, is one of the best of its kind. A High School of Commerce for boys was established in 1906, and a High School of Practical Arts for girls was established in 1907. In 1907 a Department of School Hygiene was created, to take charge of all work in athletics, play, health, medical inspection, nurses, military drill, etc. In 1908 a city pension fund was created by law.

Present School System. — The school system of Boston, as organized and conducted in 1908, is as follows: —

At the head is a School Committee of 5 members, elected from the city at large. A Schoolhouse Department, consisting of 3 Commissioners appointed by the Mayor, has charge of the construction and repair of school buildings. The School Committee elects a Secretary, Business Agent, Auditor, and a Schoolhouse Custodian, who hold office during good behavior and efficiency, and who appoint their own assistants, subject to the approval of the School Commissioners. The School Commissioners also appoint a Superintendent and 6 Assistant Superintendents, who form a Board of Superintendents, and who hold office for 6 years each. The Secretary keeps all records of the School Commissioners and of the Board of Superintendents; compiles all reports and edits all publications; issues all notices and certificates; has control of the offices; and, in general, oversees all clerical work connected with the general administration of the schools. The Business Agent keeps a complete set of books, showing in detail all receipts and expenses of the schools; prepares all payrolls; examines all bills presented for payment; approves all requisitions; submits a monthly statement of appropriations and expenses to the School Committee; and prepares an annual financial report. The Auditor acts as the executive officer of the School Committee for the purchase, storage, and distribution of all supplies required by the schools; furnishes all supplies as needed and takes a receipt for the same; obtains bids for all articles needed; certifies as to the correctness of all purchases and bills; and submits an annual report of his work and an annual estimate of needs to the School Committee. The Schoolhouse Custodian acts for the School Committee in the care and custody of the lands and buildings used for school purposes; with the approval of the School Committee appoints, transfers, suspends, and removes all janitors and engineers; inspects all buildings; issues requisitions for fuel and all janitors' supplies; and keeps on file a complete record of the business of his department. The Superintendent of Schools is the executive officer of the School Committee with reference to all matters relating to instruction and discipline in the public schools; may make supplemental regulations, as he deems necessary; acts as Chairman of the Board of Superintendents and instructs them as to their work; appoints and removes all teachers, subject to the approval of the Committee; may transfer or suspend teachers as he sees fit; has oversight of the work of the truancy department; and submits an annual report to the School Committee. The Board of Superintendents has control of the course of study; passes on all books and apparatus proposed to be purchased; awards all diplomas; conducts all examinations for certificates of qualification to teach in any of the schools of the city; issues all certificates; and arranges the lists of eligible teachers.

The school system consists of 1 normal school, 14 day high schools, 64 day elementary schools, 109 kindergartens, a parental school, and a school for the instruction of the deaf, 6 evening high schools, 14 evening elementary schools, and 5 evening drawing schools. Practically no children are excluded from school because of lack of school accommodation. The system employed 2673 teachers in the day schools, 408 teachers in the special and evening schools, and 148 special teachers, — 78 of whom were in household science and arts, and 49 in drawing and manual training. 28 playgrounds were opened, and 30 school nurses were employed in 1908. A Truancy Department and a Department of School Hygiene are maintained. A city pension system, sabbatical vacations, years of rest for long service on pay, and a plan of promotion based on education and training, are provided. Free textbooks and supplies are provided in all schools. The high school system is especially complete, there being a Boys' Latin School, a Girls' Latin School, a Boys' English High School, a Girls' English High School, a Boys' High School of Commerce, a Boys' High School of Mechanic Arts, a Girls' High School of Practical Arts, and mixed high schools in Brighton, Charlestown, Dorchester, East Boston, Roxbury, South Boston, and West Roxbury. A city Normal School, open since 1904 to both sexes, completes the system at the top.

The cost of the system for the financial year 1908–1909 was $3,957,551, not counting new school buildings constructed, which cost $774,920 additional. This amount is all raised by local taxation, the rate of which was fixed by law in 1901. The total tax allowed must not exceed 34 cents on the $100 of the average valuation of the city during the 3 years immediately preceding. Of this, 4 cents must be appropriated for new buildings, lands, and furniture, and 2.5 cents must be used for repairs and alterations. This leaves 27.5 cents with which to conduct the entire school system, an amount lower than any other Massachusetts city. Though the maximum amount is levied, the increase of pupils in the schools and the increased school facilities provided far outrun the increase in valuation of the city. Between 1901 and 1908, the assessed valuation of the city increased 18.7 per cent, the enrollment in the day and evening schools increased 24 per cent, and the net cost per pupil increased from $32.96 to $34.52. During the same period, the enrollment in the high schools, where the per capita expense is double the average for the system, increased from 7.48 per cent of the total enrollment to 10.88 per cent. The result is that the School Committee has been forced to adopt the most rigid economy to enable it to conduct the schools within the appropriations available. The evening lecture system has had to be abandoned; the reduction of the number of pupils per teacher from 50 and 60 to 44, as proposed, has had to be postponed; floors and windows are cleaned less frequently than they should be; the day industrial schools, as proposed, cannot be started; and the salary schedule for teachers is endangered. It is probable that legislative relief will soon be granted. E. P. C.

References: —

Among the more useful articles and books are the following: —

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Boston School Administration. *Educational Review*, April and June, 1906. Early efforts for reform, and 1905 reorganization.

Jenks, Henry F. *Catalogue (and History) of the Boston Public Latin School* (1886).

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Spencer, David. School Reform in Boston. *Atlantic Monthly*, July, 1907.

BOSTON COLLEGE, BOSTON, MASS. — A Catholic institution for higher education, chartered in 1863, and controlled by the Society of Jesus. Students are admitted on graduation from the Boston College High School, which is connected with the institution, on certificate from approved high schools, or by examination, the requirements for which are equivalent to 16 units. The degree of B.S. is conferred. There is a faculty of 14 professors.

BOSTON EVENING LAW SCHOOL, Y.M.C.A., BOSTON, MASS. — Established in 1895 to provide employed men with an opportunity of obtaining a legal course equivalent to that of university schools of law. In 1904 the school was incorporated and empowered to grant the degree of Bachelor of Laws at the end of a 4 years' course. The school admits without examination graduates of colleges, scientific, and 4 years' courses in high schools over 18 years of age.

BOSTON UNIVERSITY, BOSTON, MASS. — A coeducational institution chartered May 26, 1869. The first department was the School of Theology, projected in 1839 by graduates and friends of Wesleyan University as a commemoration of the first centennial of Methodism; after 25 years at Newbury, Vt., and Concord, N.H., the school was removed to Boston and called the Boston Theological Seminary. Adopted by the university in 1871, it was the first seminary in the United States to introduce the study of comparative religion, and the first in New England to include members of other denominations among its public lecturers. The School of Law was opened in October, 1872; it offered a 3 years' course from the outset. The School of Medicine (Homeopathic), opened in 1873, adopted the New England Female Medical College and occupied its building. The first undergraduate department, the College of Music, established in 1872, had a fairly successful career, but was taken over in 1891 as a graduate department by the New England Conservatory of Music, ceasing to be part of the university. In spite of the depreciation in the resources of the university consequent upon the Boston fire of 1872 and the panic of the following year, a second undergraduate department, the College of Liberal Arts, was established in 1873; this school grew rapidly, and the requirements for admission were soon advanced until they were a year in advance of those in force at other classical colleges. Provision for a College of Agriculture was made in the original charter of the university, but the financial difficulties of the early seventies delayed its organization. In January, 1875, the Massachusetts Agricultural College at Amherst was affiliated with the university as an agricultural department. A graduate school, overlapping in its activities the work of several schools, and intended ultimately to crown the whole university structure, was projected at the founding of the university, and for a number of years was ambitiously styled the School of All Sciences. The plan of the university involved a combination of English and German university ideas; provision was made for a group of undergraduate colleges, not necessarily in one place, and for several professional and nonprofessional graduate schools. In organization, the university is sectarian; two thirds of a self-perpetuating corporation, of not less than 10 or more than 30 trustees, must be members of the Methodist Episcopal Church. Each trustee serves 5 years. The full professors constitute a Senate, with the usual powers of a university faculty. In theory, graduation from a school is held to admit to membership in the university; the entire body of graduates, about 6000, is styled the University Convocation, and has (1909) 16 representatives in the Corporation, 3 in the Council (which comprises the president and heads of the schools), and 25 in the Senate.

Fraternities have been established as follows: Beta Theta Pi ; Theta Delta Chi; Sigma Alpha Epsilon; Kappa Kappa Gamma; Alpha Phi; Gamma Phi Beta; Delta Delta Delta; Pi Beta Phi; Phi Delta Phi; Epsilon Tau; Sigma Kappa; Phi Alpha Gamma; and Gamma Eta Alpha.

The bachelor's degree is given in arts, law, science, medicine, and surgery; the master's degree in arts and law; and the doctor's degree in medicine, philosophy, sacred theology, and law. This last degree (LL.D.) is given to holders of a master's degree, upon presentation of a thesis after 2 years of approved advanced work.

The establishment of Boston University followed the bequest for this purpose by Isaac Rich of the bulk of his estate; originally appraised at $1,700,000, it had depreciated in 1872 to $700,000. In 1906 the productive endowment was $1,031,365; the total annual income was $155,365.47. Grounds, buildings, and equipment were valued at $886,776. The average salary of a professor is $2466. The instructing staff numbers (1909) 158; there are 1459 students, divided as follows: College of Arts, 314; Specials, 275; College of Agriculture, 500; School of Theology, 196; School of Law, 319; School of Medicine, 102; Graduate School, 104. Of the students, 419 are women. Sixteen foreign countries and 31 states and territories in the United States are represented.

C. G.

BOTANIC GARDENS, EDUCATIONAL WORK OF. — The botanic garden as an educational institution is a comparatively modern development, but may be traced backward through a series of gradual stages to the time when man first began to cultivate wild plants. The first gardens were cultivated for useful rather than ornamental purposes, and the earliest Greek gardens were little more than olive orchards. The Greeks also developed ornamental flower gardens, and this idea was borrowed from them by the Romans.

The remote ancestry of the true botanical garden is to be found in the earliest attempts to cultivate medicinal plants. Pliny (23–79 A.D.) mentions such a garden owned by Antonius Castor, in Rome, and, early in the Christian erá, the monks in Italy began to grow medicinal herbs in the monastery gardens. This practice was subsequently undertaken by the early apothecaries, giving rise to the so-called "physick gardens," for the growing of "simples." Such gardens were naturally utilized to forward the work of instruction in *materia medica*, in connection with the medical schools.

About the sixteenth century occurred a renaissance of the scientific study of plants, and the early herbalists began to cultivate living specimens for botanical study. Thus the modern botanic garden may be traced from the vegetable garden and orchard, through the ornamental garden, the physic gardens, and the private gardens of the herbalists, an interesting and very natural parallel to the development of the science of botany itself; for plants were first studied as articles of diet, then as the source of remedies for disease, and only subsequently for their own sake, from the standpoint of the modern botanist.

There are to-day over 200 so-called botanical gardens in various parts of the world, 36 of which are in Germany, 23 in Italy, 22 in France, 16 in Russia, 13 in Austria-Hungary, and 12 each in Great Britain and Ireland, and in the United States.

Formal instruction was undertaken by botanical gardens as early as 1545, in the garden at Padua, where lectures on plant life were given, and a crude form of laboratory work undertaken in the form of *ostencio simplicium*, or demonstrations of medicinal herbs. Even before this date the public study of botany was inaugurated at the garden of Pisa (1543), by order of the Grand Duke Cosmo I, and the second director of this garden was the celebrated botanist Cæsalpino, the successor of Ghinus, who, in 1547, founded the garden at Bologna.

The educational work of botanic gardens falls naturally under six heads: 1. Information by means of well labeled specimens. 2. Popular lectures. 3. Research work. 4. Periodical and other publications. 5. Courses of lectures and instruction to organized classes. 6. Docentry. These various phases of botanical education developed in connection with gardens approximately in the order here named.

1. Information by means of well labeled specimens. A museum has recently been described as a collection of attractive labels well illustrated by specimens. The earliest educational work of botanic gardens was confined almost entirely to what might be accomplished by such means. In other words, the garden was a place where any one sufficiently interested could go and "educate" himself, *i.e.* secure without the aid of a teacher a certain limited amount of information about plants. From the nature of the case, this must always remain a prominent and valuable phase of botanical instruction by gardens. In the early gardens the labels gave only the scientific name of the plant, but subsequently there were added the common name, the geographic distribution, and the place of the specimen in the system of classification — the family to which it belongs. So long as no attempt was made to illustrate any phase of botany but classification, such labels indicated the limits of information one might obtain; but, as a rather modern development, appearing first in this country in the Missouri, Harvard, and New York gardens, plantations were organized on other bases, such as geographical distribution, relation to environment (ecology), modification of parts (morphology), economic use both for food and medicine, plant breeding, and the history of botany. Thus the range of information to be obtained from labels was greatly extended. But after all, and at best, the result was for the most part only information about plants, more or less detached and uncorrelated; not botanical education. The general public visit a botanical garden for recreation rather than information, and while these well labeled plantings do a real service, and meet with a genuine and widespread appreciation, they leave much to be desired. They would be justified, however, from the standpoint of education, if they did no more than extend the interest of the public in things botanical, or serve to give an added interest in life.

2. Popular lectures. As an educational force in botanic gardens, popular lectures are only second, in time of development, to the labeling of specimens. They were introduced as early as 1545 at the Padua garden. At first they were no doubt largely confined to the medicinal properties of plants, illustrated by living specimens from the garden and greenhouses and by dried specimens from the herbarium. Later they have been extended to all phases of scientific botany, from the early spring flowere to botanical exploration and theories of heredity. The introduction of the stereopticon has here, as elsewhere, done much to increase the interest in such lectures. At the free weekly lectures given every Saturday after-

noon throughout the year at the New York Botanical Garden, the attendance varies from 50 to 500, depending upon the weather, the topic, and somewhat upon the time of the year and the extent of the lecturer's reputation. The average attendance, however, is increasing.

3. Research. Botanical Gardens, in the true sense of the word, have always been centers of investigation, otherwise they tend to become merely pleasure parks. The educational work of the early physic gardens was very largely research, while practically no attention was given to popularizing. Thus, when John Gerarde, in the latter part of the seventeenth century, acting for Lord Burleigh, prepared the letter to Cambridge University, recommending that a physic garden be established there, the purpose stated was to encourage " the facultie of simpling "; and the gardens of Bologna, Montpellier, Leyden, Paris, and Upsala (the seat of Linné's labors), flourished in the middle of the seventeenth century for the primary purpose of aiding teaching and research. Well equipped garden laboratories for research are becoming more and more common, especially in gardens organically connected with or affiliated with colleges and universities.

4. Publications. At first these were mainly confined to catalogues of the living plants, then were introduced guides to the grounds, seed lists, lists of plants offered in exchange, guides to the museum and conservatories, and finally monthly and other periodicals, embodying the results of research, and other matters pertaining to the advancement of botany or the organization of the institution.

5. Courses of lectures and instruction to organized classes. This is one of the latest and most important educational developments of botanical gardens. Regular courses were offered to medical students as early as 1829 in the Chelsea Physic Garden, and this has now become an important phase of activity, especially of all gardens connected in any way with educational institutions. In fact, didactic instruction by botanic gardens has developed parallel with the growing tendency to establish them in connection with universities or other educational institutions. In the earliest and later private gardens, practically no attention was given to teaching. In the physic gardens of apothecaries' societies and schools of medicine, the teaching was confined to the nature and properties of medicinal plants; but, with the organization of university gardens and gardens closely articulating with institutions of learning, was introduced formal instruction to classes in various phases of pure and applied botany. The public school system of Pittsburg furnishes what is doubtless a unique instance of a botanic garden and laboratory as part of the equipment for science teaching in high schools. The new Botanic Garden, established by the Brooklyn Institute of Arts and Sciences, while not organically connected with any school, and while planning ample provision for research, was inaugurated primarily as a teaching institution. The plan involves a staff of teachers, as well as of investigators, and the organizing of classes of both elementary and advanced grade.

6. Docentry. Docentry is a comparatively new idea in education, and is confined to institutions devoting a considerable portion of time to the popularizing of knowledge. So far as the writer knows, the New York Botanical Garden was the first, and is to date (1910) the only botanical garden employing docentry. The former system, here as in most other gardens, was that of personal guides for visitors who apply, and aids and gardeners were detailed for this purpose. Under the new system there is a regularly appointed " docent," who leaves the front door of the museum building every week day afternoon at 3 o'clock, with a definite route for each day. Parties may start with the docent, or he may in turn meet with two or three interested visitors, volunteer interesting information concerning the trees and other plants of the collections, and thus assemble an extempore class. The Saturday trip is confined to the museum, herbarium, and library (containing many rare and historically interesting volumes), and is completed in time to permit those who wish to attend the weekly public lecture at 4 o'clock.

There is outlined below the educational work of various gardens, in the order of their age. The date indicates the year in which the garden was established.

1. Jardin des Plantes, Paris (1610). As is well known, the Jardin des Plantes is only partially devoted to plants, the botanical work being, in fact, quite overshadowed by the zoölogical. On Sunday afternoons public lectures on botanical subjects are given in the amphitheater of a special building. These lectures, locally called " conferences," are illustrated by lantern slides, museum specimens, and living plants from the conservatories, and admission to each course is by ticket.

2. Tokyo, Japan (1638). This garden, now the garden of the Imperial University, was established by Tokugana the Third, at Shinogawa, on the southern side of Yedo (modern Tokyo). After the revolution of 1868 it was taken over by the Meji government, and was again transferred to the Imperial University in 1869. At this last transfer its old name, *Oyakuyen* (" The Medical Plant Garden ") was changed to *Igakkoyakuyen* (" The Medical School Garden "). In 1871 it came under the supervision of the Educational Department of the Empire, and in 1875 its name was again changed to *Kaishikawa*, Botanic Garden. In 1876 it became part of the College of Science of the University. Instruction is given to university students in botany, entomology, and pharmacy, while the grounds are open to the general public.

3. Chelsea, England (1673). Chelsea is almost unique, among the early gardens, in the extent to which it organized instruction in various branches of pure and applied botany. The garden was established by the Society of Apothecaries of London, on lines similar to the private gardens of the herbalists, differing from them in being supported by a public society. It was the first public institution of its kind in London, and is now the oldest. As early as 1633 the Society of Apothecaries inaugurated an annual "herbarizing," which was discontinued after a short period; but after the opening of the Chelsea garden these herbarizings were renewed, and soon took the form of a demonstration of plants to the members, by the "Demonstrator of Plants." In 1829 weekly demonstrations were begun, confined largely to the specimens in the materia medica department of the garden, followed by a lecture. The successive lectures were planned to form a summer course of study in botany. The titles of the lectures in one course were as follows: (1) the different systems of botany, both natural and artificial, particularly those of Linnæus and Jussieu; (2) the structure and growth of plants; (3) the different parts of plants, with their description and uses in the process of vegetation; (4) the natural and chemical analyses of vegetable matter; (5) the medicinal use of the most important articles in the materia medica, etc. These lectures were well attended by medical students, and when Lindley was made Director of the Garden (*Praefectus Horti*), and Professor of Botany, the lectures were held twice a week at 8:30 A.M. in May, June, and July, instead of weekly at 10 A.M. from May to September. At the close of this course an examination was given, optional to the students, and a gold medal, worth ten guineas, awarded to the candidate attaining the highest grade. The awarding of prizes began in 1830, was discontinued in 1853, but subsequently renewed. It is interesting to note that among the successful competitors were Huxley, Masters, and H. C. Bastian.

In the "Rules and Regulations as to Admission to the Garden, Lecture Room and Laboratory," issued Nov. 20, 1902, it was stated that: "I. The purposes for which the Chelsea Physic Garden is maintained are: (1) To render assistance in the teaching of botany; (2) To provide material and opportunity for Botanical investigations; . . . (4) Teachers holding tickets of admission will be allowed to introduce their students to the Garden for purposes of study, but each teacher will be held responsible for any damage that may be committed by his or her students whilst in the Garden." Individual students and classes with teachers take advantage in large numbers of the opportunities offered, and in addition specimens are furnished to teachers for class use.

4. Kew (1759). The famous Kew gardens date from the appointment of William Aiton, a pupil of the Chelsea Garden, to organize a physic garden for the Princess Augusta, of Saxe-Gotha, Dowager Princess of Wales. The ornamental garden around the royal residence was utilized for this purpose. The only formal educational work at Kew is the training of gardeners, but this is thoroughly organized, and very important, for Kew is the source of gardeners for most of the colonial gardens. Five years of practical experience are required for entrance upon the course, which includes lectures in physics, chemistry (as related to botany and geology), general botany, economic botany, and geographical botany. Each student is required to collect a herbarium of 250 named and mounted specimens, and, if his work is satisfactory, he receives a Kew certificate at the end of two years. Kew remained a private possession of the Crown until 1840, when it was made a public garden, with Sir William Hooker as the first director.

5. Edinburgh (1763). This garden is a part of the University of Edinburgh. It has museums, classrooms, and laboratories, where most of the instruction in botany in the university is given.

6. Harvard (1805). Established and continued primarily to further botanical teaching and research in Harvard University.

7. Buitenzorg, Java (1817). The 's Lands Plantentium, at Buitenzorg, is the finest botanical garden in the world. It has well equipped laboratories for research, a botanical library of over 40,000 volumes, and one large building devoted exclusively to laboratories for visiting botanists from other countries. Certain European governments send annually a student to Buitenzorg, and other countries are represented at irregular intervals. The work is almost entirely research.

8. Missouri, St. Louis, Mo. (1859). These gardens are known locally as "Shaw's Gardens," in honor of the founder, Henry Shaw. Among the objects named in the enactment that established the garden is the dissemination among men of a knowledge of plants, "by having a collection thereof easily accessible; by the establishment of a museum and library in connection therewith, and also by the establishment of public lectures and instruction upon botany and its allied sciences." In 1885 the same benefactor endowed the Henry Shaw School of Botany, at Washington University, St. Louis, and provided for the coöperation of this school with the botanical garden. The professor in the Shaw School of Botany is the director of the garden. In addition to serving the needs of the students and staff of the Shaw School of Botany, the garden grounds are open to the public, and the founder's will provides that there must be preached an annual sermon on the power, wisdom, and goodness of God as shown in the growth of flowers, fruits, and other products of the plant world. The collections are freely used by the teachers with their classes in nature study.

9. Montreal (1885). It was the intention of the founders of this garden to make ample provision for formal instruction in botany, pure and applied, but the institution was under municipal control, and finally " killed by political differences in the city council."

10. The New York Botanical Garden, Bronx Park, N. Y. City (1894). The forerunner of this garden was the " Elgin Botanic Garden," of Dr. David Hosack, in New York City (the present borough of Manhattan). The garden was successively transferred to New York State and then to Columbia University, but was finally abandoned for lack of money. The present garden has a coöperative agreement with Columbia University. The herbarium and botanical library of the university are deposited with the garden, and the university students and staff in botany enjoy, without any additional fees, all the privileges of the garden. The undergraduate courses are all given at the university, but much of the research is carried on at the garden. Weekly lectures on " popular " and semi-popular botanical subjects are given on Saturday afternoons throughout the year. The system of docentry, inaugurated in 1910, has been referred to above.

Probably the most elaborate attempt ever made on the part of an institution of this character to coöperate with and aid the nature-study work of public schools, are the courses of spring and fall lectures given to the teachers and pupils of grades 4 B and 5 B of the city schools. In the Annual Report of the Director-in-Chief for 1904, it was recommended that " lectures designed with special reference to the need of teachers and their pupils might be given with advantage," and, on March 29, 1905, the Board of Education of the city passed resolutions empowering the principals to arrange for the lectures. At the close of the first course the District Superintendent reported that the results were most gratifying, the children, in some instances, being stimulated to make collections of fungi, ferns, and mosses, and to cultivate window boxes further illustrating the subjects of the lectures.

There were two courses arranged; one of two lectures and demonstrations to grade 4 B, and one of three lectures and demonstrations to grade 5 B. After a lecture, illustrated with the stereopticon, and given by a regular member of the garden staff, the pupils are taken out on the grounds in groups of 30 to 40, where demonstrations are given on the subject of the lecture. This work is followed up during the next week in the classroom.

During the first year the lectures were given to the pupils of Bronx borough only, but in 1906 the privilege was extended to the public schools of Manhattan, and the afternoons of four days of each week were given over to the lectures. The pupils, accompanied by their teachers, come on trolleys, elevated roads, and subway, each paying his own fare, and, notwithstanding this fact, and the further fact that attendance is optional with the pupils, the attendance increased from about 5000 pupils in 1905 to nearly 13,000 (9378 from the Bronx, and 3391 from Manhattan) pupils and teachers in 1906. During 1906 the work was inspected by many teachers, including several from Europe, and the course was repeated on Saturday mornings for teachers unable to be present on the afternoons regularly scheduled. The attendance of pupils from Manhattan was not continued, owing partly to the long ride on the elevated railroad. It should be stated that there is no record of any mishap to the pupils in going to and from the garden. In 1909 7273 pupils and 235 teachers from grade 4 B, and 9622 pupils and 341 teachers from grade 5 B, or a total of 16,895 pupils and 576 teachers, attended these lectures.

11. The Brooklyn Botanic Garden (1910). This garden was established by the Brooklyn Institution of Arts and Sciences, in coöperation with the municipal government of greater New York. It is the primary purpose of the garden to combine instruction in botany to classes with research work, and to assist in every practicable way the botanical work of local schools, both public and private. The plans provide for the organization of a staff consisting, not only of investigators to have charge of research, but also of members whose primary duty will be the conducting of classes in various branches of the science, including courses for beginners. Ample provision is made for carrying out this purpose in the plans for the laboratories, greenhouses, and plantations.

In addition to the institutions referred to above, there should be mentioned the gardens at Oxford and at Cambridge (England), at Munich, Amsterdam, Berlin, Vienna, Geneva, St. Petersburg, and Montreal (McGill University), nearly all of which are affiliated with universities and are centers of botanical instruction and research, while well organized gardens are found at the Michigan Agricultural College (Lansing, Mich.), the University of California (Berkeley), the University of Pennsylvania (Philadelphia), John Hopkins University, and Smith College. The educational work of the Royal Botanic Society's Gardens, at Regent's Park, London, is also extensive, covering popular lectures, the supplying of materials to classes in schools, and the organization of a practical school for the training of gardeners. Educational exhibits are also held here from time to time to illustrate the nature study of the local public schools. C. S. G.

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BOTANY. — The science of botany has had a peculiar history as a subject of university study, chiefly because its purpose has been misunderstood even by the university public to the present day, and also because its numerous aspects have prevented anything approaching uniformity in presentation. There are still thousands of intelligent people, intelligent enough to be patrons of universities, who think of botany as the science that gives names to flowers, and this deadening conception has proved a most effective obstacle to the recognition of botany as a university subject. As a result, botany was the last of the major sciences to attain a position of first rank in the universities. Even when established, the subject is so many-faced that it presents a different aspect in each university. Especially is this true if either a teacher with initiative or a strong tradition dominates the situation. For such reasons it is impossible to give an account of the development of the subject as a university study, or even its present status, which will include any considerable number of universities. The following statements, therefore, must be understood to apply to those institutions in which botany has had a history and has made progress.

History of Botany as a University Study. — In the sixteenth century, the study of plants was a recognized part of medical training in Europe. This study had only in view a knowledge of the products of plants useful in medicine. This was the first phase of botany, and it was long recognized as natural that botanists should come by way of a degree in medicine. This same conception dominates in the provision for botanical instruction in the German universities to-day, where the only required work in botany is a course for students of medicine and pharmacy, a course which includes most of the students of botany in the universities, and involves most of the income of the instructor. For the same reason, the university textbooks are compelled to devote a large proportion of their pages to a classification of "medicinal plants."

The second phase of botany followed of necessity. It was necessary to classify medicinal plants, and this classification began to assume scientific form toward the close of the sixteenth century. The classification or taxonomy of the higher plants gradually became a university study, and dominated botanical instruction until the latter half of the nineteenth century. This long preëminence of taxonomy is responsible for the persistent popular misconception of the purpose of botanical instruction. In fact, there are even yet universities that represent only this second phase of botany. It must be understood that the appearance of a new phase of botanical instruction did not involve the abandonment of the older phases, for they have been carried forward continuously.

Since what may be called the taxonomic era of botanical instruction in American universities was a notable one, it may be used as an illustration. The dominating influence in this instruction was that of Asa Gray, whose textbooks and manuals were models of clearness and convenience. The texts were intended to make students familiar with those facts and their terminology which would enable them to use the manual in the identification of plants. Usually the student was required to collect and identify a certain number of the plants of the neighborhood, and occasionally to preserve these plants in what was called a "herbarium." This kind of instruction appealed to very few colleges and universities of 50 or even 30 years ago as deserving the recognition of a distinct professorship. In case it was recognized at all, it was given as a short course by some instructor whose chief subject was something else. Naturally the subject was more conspicuous among the Eastern colleges and universities than among the Western, and perhaps for this reason the more modern phases of botany have not been recognized so rapidly by the former institutions as by the latter.

The modern phase of botany was introduced by the work of Hofmeister, which 10 years later (1859) was supplemented by the stimulating effect of Darwin's *Origin of Species.* In fact, modern biology in the universities may be said to date from the appearance of Darwin's book. Laboratories supplied with compound microscopes and their accessories became an essential part of the equipment of universities, and biological work from the new point of view became established. This movement was felt first in the German universities, and was developing there for at least 30 years before it became noticeable in American universities. The method of introduction of modern botany into American institutions was unfortunate, in the sense that it long delayed a proper recognition of the subject. It came in as a part of general courses in biology (*q.v.*), the texts and laboratory guides for which were always written by zoölogists. As a consequence, zoölogy (*q.v.*) received so much the greater emphasis that to this day it is thought of as synonymous with biology, and botany lagged behind in development and in recognition. The real segregation of botany from animal biology in university courses began with the appearance of Bessey's *Botany* (1880), which was in effect the introduction of Sach's *Lehrbuch* into American laboratories. Since that time botanical laboratories and texts have multiplied; in one institution after another botany has emerged from its zoölogical submergence; and, although delayed, it has now become established in most universities as one of the major subjects.

Present Academic Status of Botany. — In the German universities botany is an established subject of the first rank, with its staff of instructors, and usually its separate buildings. To these laboratories for many years the American student went for the special training he could receive in no other country. As a consequence, the type of botanical instruction in American universities has the spirit, if not all the methods, of that given in German universities. There are very few general courses in the German universities except those given to the large groups of medical and pharmacy students, the other university students electing botany being set at research almost at once. It should be remembered, however, that such students have had rigorous elementary training in botany in the gymnasium, which is perhaps more than equivalent to the average amount of undergraduate instruction in botany in American colleges.

In the British universities the full recognition of botany has developed very slowly, apparently often being tolerated rather than encouraged. The enormous body of British conservatism, especially in education, has given botany a chance in the universities, but hardly what could be called an opportunity. There are two or three notable exceptions to this statement, and they are the promise of a more general recognition. There are botanical instructors in the universities, but the equipment and the structure of the curricula do not encourage and sometimes do not permit students to enter courses in botany. In spite of this, and perhaps because of this, the British botanists, unhindered by large groups of students, have been doing notable work in the advancement of the science.

In the French universities botany has a definite place, but it is taken chiefly by students of medicine and pharmacy. The classification and medicinal uses of plants are taught with great completeness and skill, but the modern phases of botany have made slow progress. The peculiar relation of the French universities to the University of Paris has repressed individual initiative in developing botanical instruction, which is more a matter of prescribed form than of personal opinion.

In American universities the newer phases of botany are well represented in instruction, and in most institutions well developed departments of botany are organized. There are great variations in the amount of undergraduate work offered, in the phases of the subject emphasized, and in the requirements for graduate work, but there is always evident the attempt to keep pace in instruction with the growth of the science. In the organization of botanical work in American universities there are two distinct theories, as evidenced by the results. One theory is to select some particular field of botanical activity for investigation, to appoint to the staff instructors trained in this field, and to make all instruction in other phases of the subject elementary and incidental. In such a university the botanical student secures very superior instruction in one phase of botany, instruction of an inferior grade in the other phases of his subject, and a distorted perspective of botany in general. The other theory is to appoint to the staff representatives of all of the major fields of activity, to put all of these phases of the subject upon an equal footing in instruction and in opportunity for research. In such a university, the botanical student secures superior instruction in several phases of botany, and a fairly true perspective of botany in general. From the standpoint of research, the former organization has some advantages, but even in such conditions research lacks the checks that other phases of the subject always supply. From the standpoint of the student, to be instructed and guided into research, the latter organization has distinct advantages.

The most striking contrast between European and American universities in equipment for botanical instruction is the botanical garden. Every European university has such a garden as an essential part of its equipment. It is true that the botanic garden was developed before the laboratory, and in a sense it is an inheritance from the older phases of botany. But none the less it is regarded also as a *sine qua non* in botanical instruction and investigation of the most modern kind. In American universities the laboratory developed first, and it seems impossible as yet for boards of control and patrons to appreciate that a botanical garden is any more than an æsthetic appendage. A university department of botany without laboratories is now inconceivable, but with the more recent developments of the subject a botanic garden is equally necessary, and its absence ought to be equally inconceivable. It is the lack of such equipment that has become a serious menace to the standing of American universities in botanical instruction and investigation.

The Differentiation of Botany. — Reference has been made to the many aspects of botany, and since these aspects differentiate university instructors and sometimes universities, it is important to indicate them. This modern development of the subject began about 1860, following a period of revolutionary ideas that culminated in Darwin's *Origin of Species.* Before that time, the taxonomy of plants formed the dominant part of botanical instruction and research, and taxonomy was in the grip of the dogma of the constancy of species. The establishment of organic evolution as a working hypothesis not only transformed taxonomy, but also gave rise to new phases of botany.

The new *taxonomy* faces the problem of variable species, whose fluctuations often baffle the attempts to define their boundaries. It is attempting to arrange these inconstant species into natural groupings, which now mean groupings on the basis of common descent. While in a certain sense, therefore, the old subject of taxonomy persists in the modern period, and must continue to persist, in a very real sense it is a new subject, with immensely more difficult problems and a different purpose.

Even more significant, however, is the rise and development of modern *morphology,* which has dominated botanical instruction and research for much of the modern period. It is distinctly an evolutionary subject, its controlling purpose being to investigate those large relationships which will permit the construction of an account of the evolution of the plant kingdom. In brief, its topic is the evolution of plants. Morphology obtained its testimony first from a comparative study of the structures of living plants, and most serviceable among these structures were found to be those connected with reproduction. Therefore, through much of its history, morphology has been the comparative study of reproductive structures.

There have been at least three notable expansions of morphology, which have made very extensive and very important additions to its material, and which have resulted in the differentiation of as many subjects and groups of investigators. First in order was the development of *cytology,* which is morphology at the limit of technique. The older morphology used the cell as the unit of structure, but it discovered that the structure and behavior of the cell itself was more fundamental. This led to the development of microscopes and of methods which would reveal the intimate structure of living cells, and since the use of such technic demands special training, there have been developed morphologists who are called cytologists. Later there developed, in connection with the vascular groups, such a comparative study of the *vascular system* that these tissues became as prominent in furnishing evolutionary data as had been the reproductive structures. As a consequence, there have developed morphologists who are known as vascular anatomists. The development of vascular anatomy made it possible to interpret the structures and relationships of fossil plants in a way that had been impossible before, and thus actual history was made to contribute its testimony to the evolution of the plant kingdom, and such morphologists are known as paleobotanists. There are thus four principal divisions of morphology to-day, divisions that distinguish instructors and often institutions, namely, morphology dealing with reproductive structures (often spoken of simply as morphology), cytology, vascular anatomy, and paleobotany.

Early in the modern period of botany the subject of plant physiology began to assume prominence in instruction and in investigation, its purpose being the study of the activities of plants. This phase of botany has developed with such rapidity and is assuming such importance that it may be regarded as the dominant phase at present. It has developed in several directions, which differentiate instructors and institutions, but its closest connections are with chemistry and physics. In fact, plant physiologists have just now more in common with organic chemists than with plant morphologists. Although physiology includes all activities of plants, a natural cleavage of the subject has developed. All those activities which may be comprised under the head of life processes of plants constitute the subject of physiology proper, while the responses of plants to their environment have been made the basis of ecology.

It is impossible to separate ecology from physiology proper, except by arbitrary convention, for the two subjects overlap at many points. Such ecological topics as the plant associations (known as societies or formations), or their succession, or geographic distribution, are the most distinct, dealing with plants in the mass, and demanding field work rather than laboratory work in the ordinary sense; but the responses of individual plants to such environmental factors as light, heat, and moisture are a part of the ordinary life processes. Ecology shares with physiology proper the present dominant interest in plant activities as contrasted with plant structures, and in some of its aspects has overlapped the science of geography. One of the conspicuous practical expansions of ecology has been forestry (*q.v.*). Forestry had long existed as a sentiment and as an empirical practice, but it has become a science by being put upon an ecological basis. Another notable development of the physiological (including ecological) aspect of plants is the immensely practical subject of agronomy. The name, perhaps, is not a happy one, but it stands for the scientific basis of agriculture, involving chiefly a study of the relation of soils and soil treatment to various plants. This subject is being investigated on a large scale by the government, but it is also a prominent field of investigation in the university laboratories of plant physiology.

The overlapping of the various fields of botanical activity is due to the increasing tendency to attack the most fundamental problems. This is illustrated not only by the overlapping of the morphological topics and of the physiological topics, but also by the necessary combination of morphology and physiology in attacking certain problems. This has resulted in a further differentiation of investigators and institutions.

One of these differentiated combination subjects is experimental morphology, which is an experimental study of the factors that determine the form and structure of plants or of their various organs. The idea that form and structure are predetermined entirely by what is called heredity has ceased to be useful; it is known that much is determined by conditions of growth and that much that is called heredity is the passing on of similar conditions rather than of similar structures.

Another combination of morphology and physiology has developed the exceedingly important subject of plant breeding. This has proved to be not only of fundamental scientific value in connection with the problems of evolution and heredity, but also of immense practical importance in agriculture, horticulture, etc. Naturally the universities are interested chiefly in the scientific aspects of plant breeding, as shown by the multiplication of instructors and courses, but they lack sadly the necessary equipment of botanic gardens. On the other hand, the agricultural colleges are just as naturally pressing the practical aspects of plant breeding, and their equipment always includes ample space for such experimental work. It should be remembered, however, that in this subject, as in all others, intelligent advance in practice is only made possible by advance in scientific knowledge.

A third combination of morphology and physiology is plant pathology. In its original development the study of plant diseases was mainly a morphological study, attempting first to discover the parasitic plant causing the disease and then to trace its life history. This knowledge was followed by suggestions as to treatment, most of which were empirical. It is recognized now that these diseases involve not only the presence of a parasite, but also a derangement of the functions of the plant body. In other words, they are physiological conditions induced by the presence of a parasite. This new aspect of plant pathology has appealed strongly to university interest, for it represents a thoroughly scientific attack upon problems of immense practical importance.

Related to plant pathology, and in certain aspects a part of it, is the wide-ranging subject of bacteriology. The bacteria are plants of such peculiar powers, are so closely connected with human interests, and demand such a special technic for their investigation, that bacteriologists represent an unusually distinct group of botanists. In fact, the subject of bacteriology is so broad that it has been subdivided into several special topics; for example, bacteria inducing human diseases, bacteria inducing animal diseases, bacteria inducing plant diseases, bacteria inducing fermentation, bacteria fixing nitrogen, bacteria in general, without reference to their economic relations, etc. This has resulted necessarily in more or less overlapping with other subjects, as, for example, in the case of pathological bacteriology in its relation to human diseases, which is thought of chiefly as a medical subject.

In the same way, the study of nitrogen-fixing bacteria is naturally associated with soil investigations.

The foregoing outline, insufficient because it neglects many important subdivisions of botany which differentiate instructors and institutions, will serve to indicate the great range of the subject as represented in universities. It is evident that there does not exist any uniform presentation of botany in universities, except in some of the fundamentals of morphology and physiology. Each university is a type by itself, and impresses its own interests and its own perspective upon its botanical students. J. M. C.

Botany in the Schools. — *United States.* — In the elementary schools plant life is used very generally in some part of the instruction. Where organized courses in nature study exist, plants sometimes constitute the dominant part of the materials for work, and in plans for nature study plants are never omitted entirely. Even in schools where there is no organized course in nature study, plants receive attention that is more or less casual in its nature. In some elementary schools the work consists solely in answering didactically the pupils' intermittent questions about the specimens that they chance to encounter. Usually, however, such topics as seed distribution, germination, types of leaf forms, and the local trees receive some attention. In schools in which an attempt is made to arrange an organization of nature-study material that is coherent and sequential throughout the grades, plant topics appear in all or nearly all the grades, the topics of one grade being more or less related to those which follow. By means of schoolroom experiments, field observations, and garden studies some schools develop acquaintance with common vegetables and flowering plants, their ways and conditions of growth, their methods of establishing succeeding generations, plants as means of decoration and as food for man and other animals. The school garden as an outdoor laboratory for the study of plants by elementary school pupils is now found in connection with every school in Austria, in most schools in France, Germany, and other European countries, and is becoming common in the United States and Canada. In some elementary schools in the central and southern United States (Michigan, Ohio, Illinois, Wisconsin, Iowa, Minnesota, Texas, Georgia, and others) considerable study is made of plants under the title of elementary agriculture, in which the plants of the farm and home are studied.

Few of the secondary schools included botany until within the past 50 years, and most of them not until within the past 30 years. The subject is usually elective, but throughout the central, southern, and western United States is now almost universally taught. In the eastern United States it is taught in the better high schools. The subject constitutes a year's course in some schools, while in others the course is a half year in length, the remainder of the year usually being given to zoölogy or human physiology. The number of full-year courses is constantly increasing, the majority of teachers believing that it is better to have a full year of one science rather than half years of two.

In some parts of this country, notably in New York State, a combination course is presented under the title of general biology (*q.v.*). The advocates of this course are readily classified into two groups: first, those who organize a year's course consisting of two smaller courses, one in botany and one in zoölogy, or three courses, botany, zoölogy, and human physiology; and secondly, those who organize a course of biological topics such as nutrition and reproduction, using illustrative material from plants or from animals, or from both. The latter point of view is extremely difficult to apply in secondary education, since at the outset the pupil has no knowledge of the plants and animals selected for illustration, and more or less confusion must result. Few secondary schools follow this plan. The first plan is adopted by a larger number of schools, but the courses are too fragmentary to give the best educative results. Almost without exception the advocates of courses in general biology are specialists in zoölogy, rather than in botany.

The year of the high school in which botany is taught varies greatly, but most schools give the subject in the first or second year, some in the third, and a few in the fourth. This variation in the length of the course and in the year in which it is given is evidence of the striking absence of generally accepted standards concerning botany as a high school science, and of an organized plan of science instruction based on a determined relationship of the sciences to one another. These considerations and others to be mentioned later suggest the acute need of the most careful scientific investigation of the best organization for efficiency of instruction, not only in botany, but in all the sciences that appear in the secondary school curriculum.

In most of the state normal schools botany is universally recognized as one of the subjects requisite for the education of those who are preparing to teach in elementary schools or in high schools. The length of the course varies from one term of three months to two full school years. Not only is botany thus recognized as an important factor in a teacher's preparation while in the normal school, but in some of the states the normal schools require that prospective students shall present botany as one of the entrance subjects. All Central and Western, and most Southern and Eastern colleges and universities will accept botany as an entrance subject, but they do not specifically require it.

Germany. — In the elementary schools botany is grouped under and included in *Naturkunde*, *Naturbeschreibung* — a conglomerate of all branches of the sciences. Such botany as is taught does not go beyond description and names of local plants and their morphology. In the secondary schools the subject is similarly grouped with the other sciences and includes a knowledge of the more important families in the natural system, the commonest diseases of plants and their causes, and the essentials of morphology, anatomy, and physiology of plant life. Generally closer attention is paid to the local and native forms, followed by some account of the geographical distribution and the elements of foreign plants. . Classroom work is supplemented by sketches and excursions. In the Prussian gymnasium about two hours a week are given in each class to *Naturkunde,* which includes zoölogy, physiology, and anatomy; in the realschule the subject receives 2 hours in the first 4 classes, then 5 hours in the next 2, followed by 6 hours a week in the three classes of the oberrealschule.

England. — A study of plants is not included in the curriculum of all elementary schools in England. Where it is found, botany is a part of either nature study or object lessons, which rarely receive more than one hour of instruction each week. In the rural schools an attempt in made to teach botany in the form of elementary agriculture. In the *Suggestions to Teachers* issued by the Board of Education simple experiments, sketches, labels, an avoidance of technical terms where possible, school walks and excursions are recommended, while the difficulty of teaching the subject in town schools is recognized.

The higher schools for boys, however, give very little, if any, attention to botany, the science studies including generally only physics and chemistry. Most large schools have natural history clubs or societies, but these are extra-class and are voluntary. Botany has, however, for a long time been a favorite subject in girls' schools, where the extent of the subject has been very much like that given for the German schools above. About two hours a week are usually given to this subject.

France. — Very little attention is given to botany in the French primary schools. Some attempt has been made to relate the "first scientific notions" with agriculture, and it is probable that developments will take place in this direction. For the present such elements of botany as are taught seem to be purely names of plants which the pupils do not see.

In the higher schools the scientific studies apart from physics and chemistry are grouped under the title of "natural history," but even in the modern schools only 1½ hours per week are given to the subject in the first 2 years and in the last, the division of science.

Botany, Methods of Teaching. — Botany was formerly taught in European colleges and universities from the points of view that were then dominant in botanical study, which were first medicinal and then systematic. Quite naturally, when physicians were the only persons who were particularly interested in plants, and the only students who studied plants were those who expected to be physicians, the medicinal aspects of botany received attention, and the teacher was a physician who was supposed to be versed in the "virtues of plants." At the present day, when there are frequent claims that the practical values of plants should be recognized in education, it is interesting to note that botany as a subject of education originated as an applied subject and was taught almost exclusively to students directly interested in a vocational pursuit.

The study of plants with real or supposed medicinal values naturally led to attempts to classify plants; and accompanying this work were many endeavors to collect, name, and preserve specimens of all available plants. Acquaintance with plants of the world and work with systems of classification became foremost, and these furnished the whole of botanical materials that were used for instruction. That the purpose of teaching botany was still related to medicine is clearly shown in the introduction to Lindley's *Text-Book of Botany,* written in 1830, an unusually successful book which passed through several editions and greatly influenced the educational development of the subject in England. Addressing the preface to "The Court of Examiners of The Society of Apothecaries, London," the author says : "As guardians of the education of a very considerable part of the Medical Profession, the subject of the following pages cannot be otherwise than interesting to you. If a knowledge of the plants, from which medicinal substances are obtained, is in itself an object of importance, as it most undoubtedly is, the science which teaches of the art of judging of the hidden qualities of the unknown vegetables by their external characters is of still greater moment. To what extent this can be safely carried, it is not, in the actual state of human knowledge, possible to foresee; but it is at least certain, that it depends entirely upon a careful study of the natural relations of the vegetable kingdom." This book, as others of its time and those immediately following it, presents first the principles of classification, then a discussion of the characteristics of each of the families of plants. To the latter discussion are appended remarks upon affinities, geography, and properties, and in a sense these may be interpreted as prophesies of the recent development and use in education of morphology and physiology.

During this same period numerous attempts were made to put botanical material into form for use in education of pupils below the college age. These usually took the form of talks or conversations on botany,[1] in which the writer attempted, in the form of conversation or dialogue, to present the structures of common plants used in classification. The most successful attempt to present for young students the prevailing notions of botany of this period was made by Dr. Asa Gray (*q.v.*) who began in 1842 the publication of a remarkable series of textbooks which in the United States were the means of giving botany a place in the secondary school. Furthermore, these books presented to beginners not only the systematic point of view of botany, but as physiology and morphology began to develop, the series was so revised and augmented as to include these aspects.

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[1] A type of these books is, *Conversations on Botany with Plates,* 4th ed., Improved. (London, 1823.)

During the earlier influence of Dr. Gray in this country there appeared in Germany Schleiden's *Principles of Scientific Botany*, or *Botany as an Inductive Science*, which was later translated into English. This book, which was intended for students of college age, illustrates by its chief divisions the growth of botanical knowledge and the accompanying change in point of view of botanical instruction. There are treated, The Chemistry of Plants (30 pages), The Plant Cell (92 pages), Morphology (330 pages), Organology, (chiefly physiology, 116 pages). The characteristics of the great groups are presented under the section of morphology, and the usual systematic presentation of the great groups is omitted.

Slowly there came a change in the point of view in secondary botany, and classificatory studies gave way to anatomy, morphology, and physiology. So completely was systematic work omitted in some places that not infrequently pupils in secondary schools and students in colleges did detailed laboratory work upon plant parts concerning whose gross outdoor appearance they were entirely ignorant. Then came ecology as the aspect of plant study that combined outdoor study and acquaintance with plants with an investigation of the dynamic factors that have to do with the life of plants in various regions. This point of view in its turn became recognized by some as the dominant one for use in secondary and elementary education. Similarly, as the science of botany has grown through a study of applied botany in agriculture, horticulture, forestry, bacteriology, plant diseases, plant breeding, etc., there have been attempts to accept one or more of these points of view as the one to determine the educational use of botanical material. It is natural perhaps that, as the science has developed, each newly recognized aspect, by virtue of its fresh attractiveness and significance, should seem most useful in education. Textbooks for secondary schools and colleges have been prepared with each of the aspects of botany as the determining feature. It is at about this period that writers of textbooks began to differentiate high school textbooks from those for colleges. It was not uncommon to find a book written "For High Schools and Colleges," and even to-day there are occasionally seen vestigial remains of this old idea, which rested upon a failure to differentiate the two fields of instruction.

At the present time most teachers of botany in the secondary schools believe that the course should be synthetic, including an introduction to all the important aspects of plant study, without treating plants under any of the rather arbitrary divisions — morphology, physiology, agriculture, etc. — that are recognized in more advanced study of the subject. This point of view has now been adopted by the two leading organizations in the United States that have considered the question. The Botanical Society of America, through its committee on education, consisting of three college teachers of botany; and the North Central Association of Colleges and Secondary Schools, through its committee on the unit in botany, consisting of twenty-two college and secondary teachers of botany, have adopted a synthetic unit course in the subject for the secondary schools. It is also believed by these committees that the science of botany has grown to such proportions that it is not wise in secondary education to attempt to keep abreast of botanical research. There is now a fairly well-defined body of botanical knowledge that should be organized for use in elementary and secondary education, almost regardless of what may happen in the research development of botany. It is assumed of course that elementary, secondary, and college instruction in the subject will avail itself of every opportunity to correct its body of knowledge in the light of the most recent botanical research.

Method of Work. — In present-day practices in teaching botany in the secondary schools, laboratory work is general, though not universal. The quantity, kind, and purpose of the laboratory work varies so greatly as to force upon our attention again the great need of a careful scientific study of the teaching of the subject. In some schools laboratory work is intermittent, being used when favorable material is encountered, and then for only part or all of a single recitation period. In other schools one or two recitation periods per week are regularly given to laboratory work, while in the best schools two doubled periods each week (occasionally more) are given to work in the laboratory. The purpose and kind of work done in the laboratory are closely associated. A comparatively small number of teachers use laboratory materials as means for an inductive study of plants. Some make no attempt at an inductive study, using materials to demonstrate statements previously made by the textbook or teacher. Not infrequently physiological experiments are performed by the teacher in the presence of the class entirely as demonstration. As such they are useful and commendable in case first-hand contact and first-hand inference has preceded, so that there is a basis for interpretation, otherwise the instruction is wholly didactic and not experimental. In many schools the pupils are given independent laboratory work, and are required to make definite statements in drawings and notes concerning their inferences, which inferences are to be made entirely from this study of materials. Following this kind of laboratory work, text assignments, recitations, and additional discussions from the teacher have a basis for interpretation and organization by the student because of his contact with plants in the laboratory. Field work and the greenhouse are important factors in the efficiency of the laboratory side of the study of which they are a part. They are increasing with commendable rapidity.

The types of textbooks in most general use are those by Coulter and by Bergen. In the former it is assumed that laboratory work is to be a part of the course, and the textbook materials are presented so as to constitute an elaboration of information that the pupil is expected to secure from a first-hand study of plants. These books do not include laboratory directions, which are given apart in a separate booklet in order that there may be independence in the study of materials. The books by Bergen also are designed for use with laboratory work, but are not so arranged as to demand as much laboratory work as the other type. The latest book by each of these authors represents a synthetic course in the subject. There are numerous laboratory manuals, ranging in plan from those that include a relatively few topics and present them in such a way as to leave the pupil to his own resources in interpretation, to those that present an impossible array of topics and by thoroughly detailed questions attempt to inform the student about all that botanical knowledge possesses regarding these topics.

The Teacher of Botany. — In its outline of the unit in botany the committee of the North Central Association of Colleges and Secondary Schools makes the following statement regarding the qualifications of the teacher: "It is believed that the teacher of botany in the high school should have a minimum preparation in botany equivalent to two years of college work. This work should include the general morphology of the lower and higher groups, elementary plant physiology and ecology, some knowledge of plant diseases and acquaintance with local plants; physiography, zoölogy, and a course in general bacteriology are also desirable. The teacher should have some knowledge of the purpose of botany in high school education and of current and desirable practice in teaching botany. Since the teacher of botany usually teaches other sciences, each demanding somewhat similar preparation, obviously to maintain this standard more general and more extended preparation needs to be urged. This standard of preparation is deemed highly desirable to give botany its proper place in secondary education, but it may not always be practicable. It is the standard that should be met by those who are now preparing to teach the subject."

It is generally recognized that the determining factor in botany, as in other science teaching, is the teacher. In subjects that are more completely organized for educational purposes less depends upon the quality and preparation of the teacher. When definiteness or organization of material is fairly general, somewhat less is required of the teacher. This definiteness is directly helpful in secondary school teaching; but in the college preparation of the teacher it is helpful in that in some subjects the part of the body of knowledge that has proved good for secondary school use may be made distinct from the parts that are for college use, or for specialists in research. The usual course of preparation, if such it may be called, of a high school teacher of botany carries him through a series of courses that are planned primarily for students who eventually may do research in botany. Possibly some may argue that preparation for research is the best preparation for teaching, but this is not yet proved. Furthermore, colleges and universities emphasize different aspects of botany, some agricultural, some cytological, some morphological, and since young teachers naturally wish to teach the things that they are most interested in, this leads to unbalanced courses, determined not by what are the educational, social, and industrial needs of high school boys and girls, but by the particular line of botany in which a particular college or university is doing its research work.

In England botany is not elected generally by secondary school students, but by those who expect to take a medical course. It is said that the subject is not elected by more pupils because it is taught so that it seems significant only to those who are going to study medicine. This suggests a very real difficulty. Botany must be taught so that, while having educational values, it has appreciable significance to those who are studying it. In this country and in England it is not uncommon for university teachers of botany and zoölogy to say that these subjects would better be omitted from secondary schools until adequately prepared teachers are at hand. It is true that an altogether too large number, fortunately a decreasing number, of secondary school teachers are teaching botany without any academic preparation; but, besides these, the teachers are the college and university product, and the universities and colleges are getting the result of their own students' work. If the schools omit these subjects, pending the further preparation of teachers, the situation is likely to be reached where " biology is not taught because there are no teachers; there are no teachers because biology is not taught." Rather it must be frankly recognized that the adequate preparation of the teacher of botany is a piece of work commensurate in importance with the adequate preparation of the research botanist. Botany as a research subject depends much upon the quality of the teaching of those general students who may perhaps become special research students of the subject. The teacher and the research man, or the prospective teacher and the prospective research student, may be combined in the same person, but, if so, the condition is a fortunate by-product and by no means a regular occurrence. O. W. C.

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BOTTA, VINCENZO (1818–1894.) — Educator and writer on education, educated in the schools of Italy and at the University of Turin; served on the educational commission in Sardinia; was professor in New York University for many years; author of *Education in Piedmont* and of numerous articles in Barnard's *American Journal of Education.* W. S. M.

BOURNE, STURGES (1769–1845). — A member of Parliament who played an active part in the English House of Commons between 1798 and 1831, and frequently held office. He was Home Secretary in 1827. He is known in the history of English education in connection with Mr. Whitbread's famous Education Bill of 1807 (see Whitbread). Mr. Bourne objected to the compulsory establishment of parochial schools, and in committee on July 21, 1807, proposed as a substitutional clause, "that it shall be lawful for the church wardens and overseers in any parish, township, or place, with the consent of the major part of the parishioners or inhabitants in vestry or other parish or public meeting for that purpose, after one month's notice assembled, or of so many of them as shall be so assembled, to establish, if they think fit, within their respective parishes, a school or schools for the instruction of the children of the poor, and to purchase or hire any buildings, or to purchase any land for the erection of any buildings, and to erect any buildings which may be found requisite for that purpose, and to employ or contract with any person or persons to be approved by the minister of such parish, to instruct the children of the poor, under such rules and regulations as they may think it expedient to adopt." This clause was adopted on August 4 and power given to the parish officers to build schools. The bill thus amended passed the Commons, but was thrown out by the House of Lords. J. E. G. de M.

BOUTWELL, GEORGE SEWELL (1815–1905). — Educated in the common schools of Massachusetts; Secretary of the Massachusetts State Board of Education (1853–1858); author of *Educational Topics and Institutions* and of several historical and political works.

W. S. M.

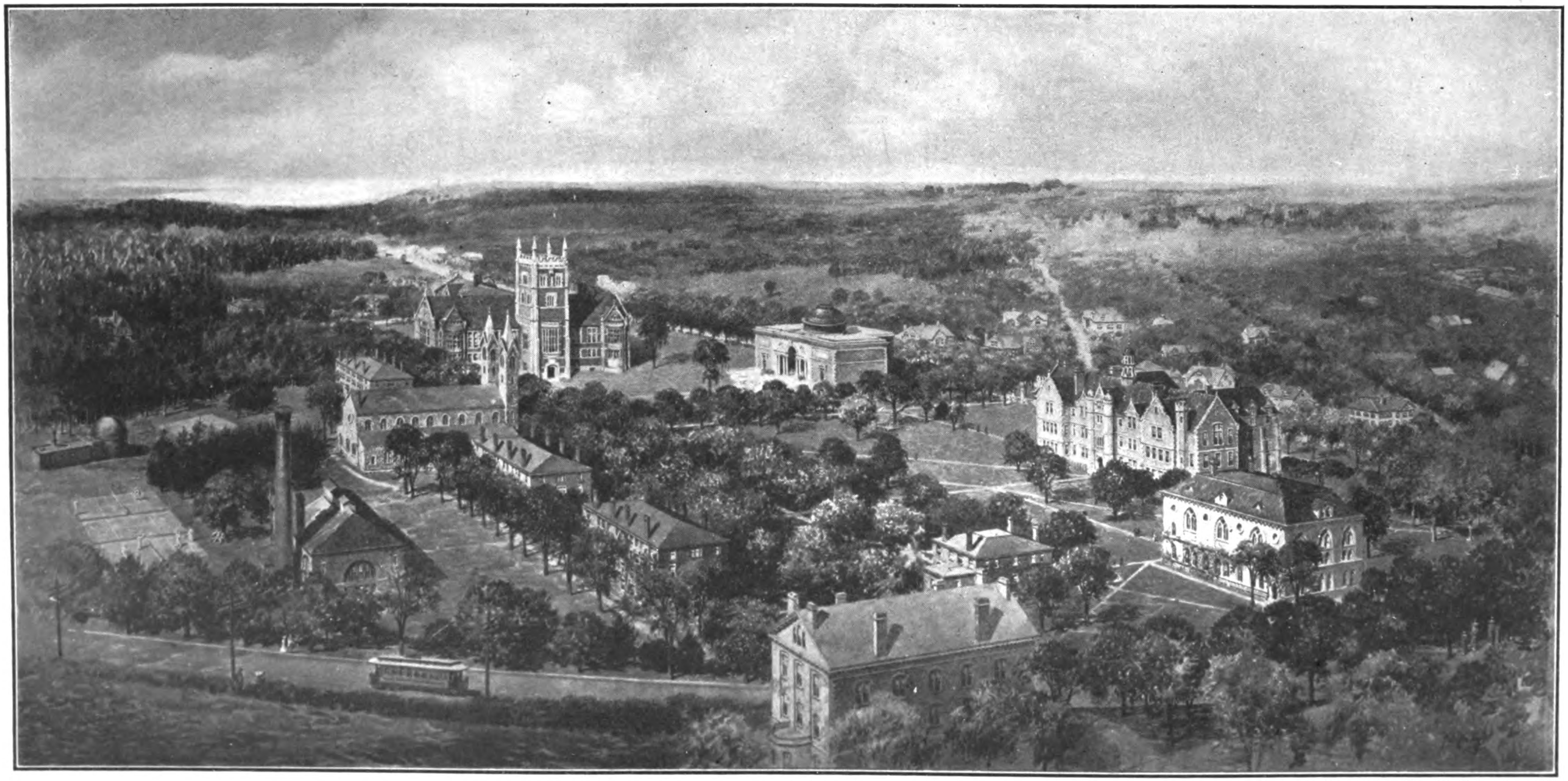
BOWDOIN COLLEGE, BRUNSWICK, ME. — A nonsectarian institution, incorporated June 24, 1794, by the General Court of Massachusetts, to meet the demand for a college in the district of Maine, since Harvard College, the nearest institution, was accessible only to the richer inhabitants. The location at Brunswick was selected as a compromise, that town being midway between Portland and small towns along the Kennebec that had offered sites for the new college. The name was chosen in honor of James Bowdoin, Harvard 1745, an important figure in the Revolution, and twice Governor of Massachusetts; he died in 1790. His son, also James Bowdoin, the first minister to Spain, besides gifts in money and land, willed to the college his library and a valuable collection of drawings. Owing to the fact that the resources consisted largely of inactive wilderness land, no building was erected until in 1802 the " House " (now called Massachusetts Hall) was completed. In September, 1802, the Rev. Joseph McKeen, Dartmouth 1774, was installed as first president, and a class of 8 students was matriculated. In 1806 a dormitory was built; in 1814 the general court appropriated $3000 a year to Bowdoin. In 1821 the first college commencement in the state of Maine was marked by the erection of a new hall and by the entrance of the largest class so far received; among its members were Longfellow and Hawthorne. By 1837 the endowment had increased to $100,000, and Bowdoin had gained a widespread reputation for scholarly thoroughness; during this panic year, however, the trustees appealed for aid and received gifts amounting to $70,000, most of the sum coming from members of the Congregational churches, a denomination with which the college had been in sympathy from the outset. In 1908 the removal of sectarian restrictions accompanying the funds for certain professorships and the transfer to the Andover Theological Seminary of the fund for the Stone professorships, led to the admission of Bowdoin by the Carnegie Foundation for the advancement of Teaching (*q.v.*) as participating in its system of retiring allowances to professors. (See the Third Report of the Foundation, 1908.)

Bowdoin has the student life of a typical " small college." Membership in fraternities included (1908) 302 students, 86.8 per cent of the total number, in chapters averaging 38 members each; most of the chapters occupy houses. The following fraternities have been established: Alpha Delta Phi, Psi Upsilon, Delta Kappa Epsilon, Theta Delta Chi, Delta Upsilon, Zeta Psi, Kappa Sigma, Beta Theta Pi, Alpha Kappa Kappa (medical), and Phi Chi (medical). The president in several reports has called attention to the need of a new gymnasium, plans for which were drawn in 1901. Athletics are regulated by the Athletic Council of the General Athletic Association, consisting of two members of the faculty, and five members each from the alumni and the students. According to tables (*Bowdoin College Bulletin*, New Series, No. 10) based on returns from 200 undergraduates, a typical low expense account is $273.86 a year; a liberal account, $388. In 1906–1907, 167 students earned on the average $283.51 each.

Bowdoin has a remarkable list of distinguished alumni, including President Franklin Pierce, Chief Justice Fuller, John P. Hale, and Thomas B. Reed; not many years ago the Senate, House of Representatives, and Supreme Court, were all three presided over by Bowdoin graduates.

Degrees given by the college are A.B., and M.A. for one year's graduate study in residence. Admission is by examination and certificate of an approved high school. The institution is a member of the New England Association of Colleges and Preparatory Schools and the New England College Entrance Certificate Board (see College Entrance Boards). In 1907–1908 the entrance requirements were advanced. After the freshman year, the studies are nearly all elective. The Medical School of Maine, established in 1820 by the first legislature of the state, was by its charter made the Medical Department of Bowdoin College; the work of the first two years is given at Brunswick and of the last two in Portland, on account of clinical advantages in that city. Nearly all the teachers in this school are officers of the Maine General Hospital in Portland.

The corporation is a self-perpetuating body, styled The President and Trustees of Bowdoin College, the membership of which is never less than 7 nor more than 13 (in 1909, 13); in



BOWDOIN COLLEGE.

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addition there is a self-perpetuating Board of Overseers, which has only a veto power and which has a membership of not less than 25 nor more than 45 (in 1909, 42). For half of its vacancies, the Board of Overseers accepts nominations of alumni. This bicameral system of government was modeled originally on that of Harvard College.

The campus of 40 acres is 1 mile from the Androscoggin River, and about 1 mile inland from Casco Bay. The library contains (1909) 92,000 volumes. Grounds, buildings, and equipment are valued (1909) at about $900,000. In 1897 the income-bearing funds amounted to $500,000; in 1909, to $2,000,000. For the year 1908–1909 gifts, many of small amounts, from alumni amounted to $542,552.16, including $20,595.64 from the General Education Board (*q.v.*), $23,812.50 from the Elizabeth D. Cummins' bequest, $20,000 from Mr. Andrew Carnegie, $33,187 from an anonymous donor, $50,000 from Mr. W. R. Porter, and $310,000 the bequest of J. E. Merrill. The total annual income is about $80,000. The average salary of a professor is $2000; the president has urged the application of part of the new endowment to an increase in salaries. There are (1909) 23 members on the academic instructing staff and 38 members on the medical; the total instructing staff is 57 (deducting for names counted twice). There are 419 students, divided as follows: academic department, 346; medical school, 74. Willam DeWitt Hyde, D.D., LL.D., is president. C. G.

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BOWDON COLLEGE, BOWDON, GA. — A coeducational institution opened in 1856 and chartered in the following year with power to confer degrees. The primary and preparatory departments give the work of the eight grades, which is continued in a four years' academic course.

BOXING. — Since the fist forms a natural means of offense and defense, boxing appeared early. Among the Greeks its invention was attributed to Theseus. References to it are found in Homer, and some of the gods, *e.g.* Apollo and Hercules, were credited with great skill in it. Boxing was introduced into the Olympic games about 684 B.C., and was always included in the pentathlon. It was also found at other national contests. The contestants fought naked, and their hands were covered with boxing gloves, of which there were several varieties, according to the severity of the blow which it was desired to inflict. Thus these gloves varied from the light rawhide thongs wrapped round the fingers to the heavy leather covering studded with iron and lead, or knots and nails. The latter were frequently used at Rome. The aim of the boxing match was to fight until one of the contestants declared himself conquered. It was against the rules to use the feet. The blows were inflicted on the head and upper part of the body. The ears were usually heavy sufferers, so that in lighter practice ear protectors were used. If both sides were agreed, pauses might be arranged for a rest. Severe wounds were common, and death was not infrequent. Boxing was introduced into Rome at an early date, and continued into the days of the Empire.

In modern times boxing is practiced chiefly in America, Great Britain, and the British Colonies. It is known also under the terms "sparring," "the Manly Art," and "the Art of Self-Defense." The participants wear large padded gloves to eliminate the danger of injury from blows. The rules of the sport permit only blows given with the hands and delivered on the parts of the body above the waist line. Boxing affords all-round vigorous exercise and serves to develop strength, agility, and endurance. The combative element in this exercise makes it valuable for the development of self-control and manliness, but when not properly supervised, it may degenerate into brutal fighting with disastrous results physically and morally. Boxing is taught in most American colleges and in many preparatory schools. The instruction is usually given individually, but in a number of colleges the principal blows and guards are taught to large classes by the same methods as are used in teaching calisthenics or dancing steps.

The association of boxing with prize-fighting has interfered materially with its general use as a legitimate branch of the physical education curriculum, but with the better organization and supervision of physical activities in educational institutions, boxing will undoubtedly come to be recognized as a valuable form of exercise in the physical education of boys and young men. G. L. M.

See Athletics, Educational.

BOY, PROBLEM OF THE. — See Adolescence; Adolescence, Hygiene of; Boys' Clubs.

BOY BISHOP. — The boy bishop, "barne-bishop," "little bishop," "youths' bishop," "scholars' bishop," "Bishop Nicholas," was one of the most curious of medieval institutions. The creation of a sham bishop to perform mock masses was one of the oldest methods of holiday making for those *in statu pupillari*. In the cathedral and collegiate churches, there was no going home for the holidays for the schoolboys, any more than there was for the boys in the monasteries already devoted (*oblati*) to become monks. But human nature must have relief, and the ecclesiastics reproduced under a religious, or rather a Christian, disguise, the holidays of the Roman popular and religious winter feasts of the Saturnalia, New Year's Day (the Kalends of January), and the Feast of Fools on Feb. 17. The older members had their OOOs as they were called, beginning on Dec. 16, the day of *O Sapientia*, from which day to Christmas Day the anthems began with "O," *O radix Jesse* for the gardener, and the like, in which in turn each officer of a cathedral or monastery gave a dinner and wine to his colleagues, days still commemorated in the Bursar's dinner at All Souls' College, Oxford, held till 10 years ago on Dec. 19. These days corresponded with the Roman Saturnalia, which also began on Dec. 16. After Christmas there were four *tripudia*, or dancings, says a canon of Amiens *c.* 1182, in the church, of the deacons (on St. Stephen's Day, he being accounted the first deacon), of priests on St. John's Day (he being a priest), of boys on Innocents' Day, and of subdeacons. Innocents' Day reproduced the Juvenalia, which concluded the Saturnalia at Rome. License was of the essence of the Saturnalia, the slave sat in his master's place, public gambling was permitted, there were public feasting, processions, and giving of presents. On the eve of Innocents' Day, in like manner, at Vespers when the *Magnificat* was sung, at the verse "He hath put down the mighty from their seats and hath exalted the humble and meek," the *deposuit*, as it is shortly called, the real bishop vacated his throne in favor of a bishop elected by the boys, the precentor handed over his staff of office, with which he ruled the choir, to a boy precentor, and the other dignitaries and canons, such as the schoolmaster or chancellor, gave place to boys that took their titles and duties. The boy bishop for the whole of Innocents' Day performed the services, including the mass itself, clad in full pontificals, preached a sermon, and gave the solemn episcopal blessing to the people. One bishop at least gave his own miter, by will, for the use of the boy bishop, while gorgeous capes and albs were provided for his companions. They went round the town in procession, the boy bishop riding, and ended with a great supper. We first hear in England of the *tripudia* in a letter of Aldhelm to Hoeddi, Bishop of Winchester, about 999, excusing himself from coming to the Christian *tripudia* with his old companions, because of his immersion in his studies. In 911, when Conrad I of Germany was staying with the Bishop of Constance, he visited the monastery of St. Gall on purpose to see the Christian *tripudia*, especially the Procession of the Infants, which was then so solemn that the boys' ranks were not broken even when apples were rolled on the pavement of the church close by them. This decorum was by no means general in later times. At St. Paul's, London, *c.* 1190, a statute prescribed that a new residentiary canon was to escort the boy who represented him on Innocents' Day back to the Almonry with dances and songs and torches and to give the boy bishop supper on the octave of the day, and if he waited for him till late at night, was excused Matins in the morning.

In the eleventh century the boy bishop's feast was combined with that of St. Nicholas of Myra, lately translated to Bari in Italy. He was made the patron saint of scholars and schoolboys, because of the tale of his raising to life again three boys on their way to school at Athens, who had been murdered and pickled by a greedy innkeeper. In many places, the election of boy bishop took place on St. Nicholas' Day, Dec. 6. At York in 1396 the boy bishop was elected on that day, and his episcopacy lasted to Candlemas Day (Feb. 2), during which time he rode about the country with five attendants, including a tenor and a middle voice singer, and performed plays before, and levied contributions on, neighboring magnates, especially the heads of religious houses. An account roll for this year is at York, and shows that the Countess of Northumberland contributed no less than £1 and a gold ring, and the boy bishop had a surplus of over £30, £600 of modern money, after paying all expenses. Various fulminations were aimed at abuses of the ceremony. In 1263 at St. Paul's, a statute especially forbade the real dean and canons from being made to perform services for the Boy, and limited his immediate attendants to sup with the Dean to 15 and those of the boy dean to 3; and in 1319 at Salisbury, statutes were aimed at preventing the crowds and disorderly processions. Yet the school-founders specially recognized it. In 1300 we find Merton College paying for the *dica* or offering of Blessed Nicholas for one of the Founder's kin boys in the grammar school attached to the college. A century later, William of Wykeham's Statutes for Winchester College in 1400, while providing that the Warden and fellows were to officiate on feast days, says, "We allow however that on the Feast of Innocents the boys may perform the divine offices after the use of Sarum," and he gave a miter of cloth of gold, and a crozier of coppergilt for the boy bishop; who is called the Scholars' Bishop in 1406, when men from Ropley came and danced (*tripudiantibus*) before him. The Eton Statutes of 1443 in the same connection, allowed the bishop of the boy scholars to be yearly elected on the feast of St. Nicholas and not on Innocents' Day, to do all services except the secret of the mass. This last qualification was in consequence of a dead set made at this and the kindred Feast of Fools by the Council of Basle in 1435. In 1464 a monk of Canterbury records as a notable event that there was no boy bishop in the grammar school there, through the master's default.

Archbishop Rotherham says in his will in 1495 that he had given to his college at Rotherham with its schools a miter of cloth of gold with silver enameled " knops " to be used by the Barne-bishop. The Puritanical Colet, who did not allow the boys of St. Paul's School " remedies," *i.e.* casual holidays, did not allow them a boy bishop of their own, but directed in 1518 that they should attend St. Paul's Church, " euery Childermasse day . . . and here the Chylde Bisshopes sermon . . . and offer 1*d.* to the childe bisshop." In 1541 Henry VIII, by Proclamation, put down throughout his dominions the boy bishop as childish and superstitious. It is odd to find the Aberdeen Town Council the very next year ordering that the " maister of thair grammar scuyll sall have 4*s.* Scotch of the sobirest persoun that resaives him and the bischop at Saint Nicolace day." The boy bishop was revived under Queen Mary, which is remarkable, as, even at Catholic Sens in France, the boy bishop was suppressed in 1547. He died in England under Queen Elizabeth, though what is probably his last sermon was preached in Gloucester Cathedral on Childermass day, 1558, and has been printed. At Noyon in France, he was suppressed in 1622, at Cologne in 1662. In the Catholic part of Germany, the Schul-Bischopp of Mainz survived to 1779. It is said that at Sens the choir boys still elected an *âne* or ass archbishop in the nineteenth century. Santa Claus (Saint Niklaus) is his modern survival. A. F. L.

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BOY SCOUTS. — See Boys' Brigades.

BOYHOOD. — See Adolescence.

BOYLE, ROBERT (1627–1691). — A prominent English man of science. A nobleman by birth, the son of the Earl of Cork, he was in a position to attract general attention and lend dignity to the study of science. After spending a few years at Eton, he traveled on the Continent and visited France, Switzerland, and Italy. He early showed a bent for study, particularly scientific, combined with a strong religious temperament. In 1854 he settled in Oxford, and soon became an influential member in a small coterie of men interested in science. The group had already met earlier in London at Gresham College under the title of Philosophic, or, as Boyle calls it, the Invisible College, in 1645. Out of these meetings grew the Royal Society (*q.v.*) in 1662, with which Boyle was connected until shortly before his death. At Oxford Boyle established a laboratory and experimented on the air pump and the elasticity of gases, the permanent contribution of which is embodied in *Boyle's Law*. His other interests were mainly religious. For many years he was Governor of the *Society for, the Spread of the Gospel in New England*, and spent much money on the circulation of Bible translations. He also left money for the payment of a stipend for eight sermons to be preached each year in London in defense of Christianity against all other beliefs. He consistently refused to take orders, as a consequence of which he was unable to accept an offer of the provostship of Eton. I. L. K.

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BOYS' BRIGADES. — Organizations which began in Great Britain to provide a definite kind of moral and civic training and a high ideal of conduct to boys in the adolescent stage who have been compelled in most cases to complete their education with the elementary schools. Nearly all the brigades are organized on a military basis, and a large number are connected with religious bodies. In addition to military drill, athletic clubs, gymnastic exercises, games, rambles, as well as Bible classes, Sunday services, and church parades, are employed as means of training. The brigades have served to popularize summer camps, which form a strong and important feature in their organization. The oldest association of this type is the *Boys' Brigade*, founded in 1883 with headquarters at Glasgow with definite religious motives, although on undenominational lines. In 1891 was organized the *Church Lads' Brigade*, a Church of England association. The *Jewish Lads' Brigade* was formed on similar lines and with similar aims on the disciplinary and moral side. Apart from the organizations with a religious motive, there arose other associations with a purely patriotic aim, and these have been fostered by the influences which came out of the Boer War. They aim not only at moral training of adolescent boys through athletics and recreation, but at the preparation of a military organization and education without the necessity of resorting to conscription. Of these the earliest was the *Lads' Drill Association*, which was founded in 1899 and was incorporated in 1906 with the *National Service League*, which frankly aims at military preparation, not even excluding conscription. The *League* includes among its objects the popularizing of rifle shooting and the establishment of rifle clubs. Of a similar type organized with a similar aim but without definite military drill is the recent association known as the *Boy Scouts*, which aims to train boys to quick and ready action, to self-reliance as well as coöperation, to serve as an intelligent subsidiary force to the army in case of necessity. This year the organization received permission to send a detachment of *Scouts* to the annual military maneuvers. The moving spirit in the association is General Sir R. S. S. Baden-Powell. The pledge taken by the members of the association is: " I will do my duty to God and my country. I will do my best to help others, whatever it costs me. I know the scout law and will obey it."

The *Boys' Life Brigade* definitely excludes military drill, but makes life-saving its central object as a means to religious and moral training. The physical instruction is given with a view to train a spirit of helpfulness to others. The association insists that its members should attend Sunday school or Bible classes. To inculcate the same principles and to provide the same training for girls a *Girls' Life Brigade* was organized. In addition to marching, gymnastics, and stretcher drill, life-saving from fire and water, hygiene and first aid, the girls are also taught sick nursing.

On the whole these movements represent a healthy tendency. In connection with and supplementing the work of the boys' clubs they are all combining to teach principles of discipline, helpfulness, courtesy, obedience, and self-reliance and to provide that comradeship and healthy recreation which are essential to adolescence and which otherwise could not be attained by the class of boys who are thus reached. Of the excellent moral and social influences and the training afforded to make healthy citizens it is not necessary here to speak.

I. L. K.

See Boys' Clubs; Moral Training.

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BOYS' CAMPS. — See Camp Schools.

BOYS' CLUBS. — The formation of boys' clubs represents a phase of preventive philanthropy, which has developed during the last quarter of a century in the larger cities of England and the United States. Many varieties have been experimented with, ranging from industrial classes to groups whose chief objects are athletics, or young people's work in religion.

As early as 1878 the famous St. Marks Place Boys' Club was started in New York, as a means of combating the neighborhood gangs which had grown up. In subsequent years numerous other boys' clubs have been founded, some by churches, some by settlements, and many quite unconnected with existing institutions. A form of club activity now exists under the direction of the public school in the so-called evening play centers, where instructors are provided for groups of boys in athletics, etc.

A well-known boys' club in San Francisco has developed as a special feature an annual walking and camping trip, which may extend hundreds of miles, and which is made partly self-supporting through entertainments given on the way. The summer outing or camp for two or more weeks has become a common feature of boys' clubs in Eastern cities, and in some cases land for camping purposes is owned or rented by the club, and its management rests on a self-governing basis.

In 1900 some 8000 or 9000 boys were enrolled in the clubs of London. Many of these have no connection with the churches. Apparently the London and other English clubs make less of self-government and parliamentary law than do the American, but in other respects they are quite similar.

The theory underlying the formation of boys' clubs is that children from 14 or earlier, whose homes are crowded and unattractive, greatly need social life, and, if left to themselves, will find it in the " gang " life of the streets, and rapidly drift toward immorality and crime. Most of the boys reached are already wage earners, and their need of social relaxation and physical exercise in the evening is especially great. Some clubs have developed features of industrial education, leading even to trades teaching, but this work is effective only with selected groups of boys. Games, gymnastics, debating, and reading are the activities usually found successful, but the fundamental object of the club is not so much to get definite results in these as to employ them as a wholesome environment to keep adolescent children off the street or away from disreputable resorts. Of late, theatricals, interclub contests, and history classes have become prominent means of developing the kind of activity needed to attract and improve members.

In practice boys' clubs are still in the experimental stage; the successful ones owe their permanence often to magnetic leaders rather than to any particular systems yet developed. Some make a feature of hard work and firm, though kindly, discipline; others allow much freedom, and strive to secure control largely through self-government. In forming clubs in congested quarters of cities, racial differences of considerable importance have been encountered, the most marked contrasts being between the Irish and the Hebrews. Irish youth have a fondness for sports and athletics, caring little for the more intellectual or purposeful pursuits; while Hebrews care most for these latter activities.

From the standpoint of social economy, the preventive or constructive significance of boys' clubs is very great, and it is believed that the movement is too important to be left to private philanthropy. In a few cities public school buildings are now utilized for club purposes, and paid leaders employed. This development is still experimental, since it is not possible here to procure the same degree of personal devotion as has been found in the philanthropic developments. Gymnasium work and swimming have proved most successful.

D. S. S.

See School Buildings, Extended Use of.

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BOYS, ELIMINATION FROM SCHOOL. — See ELIMINATION OF PUPILS FROM SCHOOL.

BRACE, JULIA (1807–1884). — A blind, deaf mute, who, at the age of 4 years and 5 months lost her sight and hearing and shortly afterwards her speech, was taken to the School for the Deaf at Hartford when she was 18 years old, and attempts were made to train her mind. She acquired some skill in the performance of household duties, and her sense of smell grew remarkably acute, but it was not found possible to train her by means of the manual alphabet as was later done with Laura Bridgman (*q.v.*).
W. S. M.

See DEAF-BLIND, EDUCATION OF.

BRADLEY, GEORGE GRANVILLE (1821–1903). — One of the great English schoolmasters of the nineteenth century who contributed to the reorganization of secondary education. Born in 1821 in London, he attended a local school until the age of 16, when he went to Rugby and came under the personal influence of Arnold (*q.v.*). In 1840, he went up to Oxford, where upon graduating he became a fellow of University College. Two years later he entered upon his career as a teacher at Rugby. In 1858 he was appointed headmaster of Marlborough College. This school, then in its sixteenth year, had suffered largely through laxness of discipline, but was just beginning to recover. Bradley brought with him the ideals of Arnold, and fearlessly devoted himself to the work before him, with the result that Marlborough came to rank with the leading public schools in scholarship and spirit. Bradley was an excellent teacher of the classics, and knew how to inspire all around him with his own untiring energy. Scathing as his criticism often was, he had that personality which could inspire fear without losing the affections of those with whom he came into contact. But his influence was not confined to his school; his works on Latin prose composition soon won an established place in all English schools and contributed to a reform in the teaching of the subject. In 1870 Bradley was elected master of University College, and in 1881 received the appointment of Dean of Westminster, which he held until within a year of his death.

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BRADLEY POLYTECHNIC INSTITUTE, PEORIA, ILL. — Opened in 1897 by the gift of Mrs. Tobias S. Bradley. A 6-year course is provided in the following 2-year divisions, lower academy, higher academy, and the college where freshman and sophomore work is done. Courses are arranged to prepare for business, trade, or technical work, for advanced study in college, university, or school of engineering, and for teaching manual training, domestic science, and drawing. On students who complete the 6-year courses the degrees of Associate in Science, Arts, or Literature are conferred. There are 9 professors, and 25 instructors and assistants. Theodore Chalon Burgess, Ph.D., is director of the institute.

BRAHMAGUPTA. — The second great Hindu writer on mathematics whose works have come down to us, and the founder of the celebrated mathematical school at Ujjain. He was born in 598 A.D., and spent his life in teaching, in writing, and in astronomical observations at Ujjain. His work on arithmetic and algebra was translated into English and published by Colebrooke in 1817. D. E. S.

BRAIDLEY, BENJAMIN (1792–1845). — Braidley, the famous pioneer in the north of England of "Week-evening Sunday schools," was born at Sedgefield near Durham in 1792. He was apprenticed to a firm of linen importers in Manchester. In 1813, the year in which the *Sunday School Teachers' Magazine and Journal of Education* was started, Mr. Braidley, then 21 years of age, became an active worker in the Bennett Street Sunday Schools. In 1815, 1635 Sunday scholars from this school received prizes, while in 1816 there were 2020 pupils on the roll. Working as a commission agent he became very wealthy and occupied various positions of importance in Manchester. In 1834 he gave evidence as to his Sunday school before the Select Committee on Education. In 1835, he twice stood (unsuccessfully) for the Manchester Parliamentary seat. In 1837 he went to America, and was deeply interested in American problems of slavery and education. In his later years he lost, through the failure of a bank, his ample fortune. He died of apoplexy in 1845. His evidence before the Select Committee of 1834 (pp. 174–187) and his notes on Sunday schools are valuable documents in the history of nineteenth century education. His school had 2700 scholars who were taught by 120 unsalaried teachers, all, save two or three, former scholars. The secular instruction given in

Sunday schools played a vital part in the growth of the nobler aspects of life in Manchester. Mr. Braidley told the committee that Sunday-schools in Manchester were open for secular instruction for 5½ hours on Sundays and for 2 evenings in the week. The age of the scholars varied from 5 to 25 years. Many of the children were too worn out, when the evening came, to think: "I have frequently seen some of them asleep before they have gone home at half-past nine." Mr. Braidley considered that in 1834 the manufacturers were (at last) favorable to the instruction of children, "and many of them the most liberal contributors to our Sunday and other schools." But Mr. Braidley, with prophetic mind, considered that a compulsory measure of education would not be unpopular among the operatives of Manchester. But that was not to come for nearly forty years. J. E. G. de M.

See Sunday Schools.

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BRAIN. — This term is used in ordinary parlance to cover all of the higher parts of the nervous system, especially those encased in the skull. In technical language, the term is little used because it is better to describe the portions of the nervous system to which reference is made with precision, using the definite names of parts.

See Nervous System.

BRATHWAITE, RICHARD (1588–1673). — Poet and author of several books of interest in educational history. The two books on *The English Gentleman* (1630) and *The English Gentlewoman* (1631) belong to the type of educational literature which was called out by the demand for courtly training. In the former of these books Brathwaite defines education as "the seasoner or instructresse of youth in the principles of knowledge discourse and action." But the *English Gentleman* is noteworthy for a remarkable characterization, at its close, of a gentleman, "a man of himselfe without the addition of either Taylor, Millener, Seamster or Haberdasher." The whole chapter is as remarkable for its literary style as for the excellent portrayal of the ideal man. Brathwaite was also the author of an interesting history, the *Schollers' Medley,* later changed to *A Survey of History or a Nursery of Gentry* (1638), in which he gives several reasons for the study of the subject. He points out its value for social training, for enabling one to "live in all ages" and to reconcile "the future and the present tense."

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BRAUNSBERG, EAST PRUSSIA, THE CATHOLIC THEOLOGICAL SEMINARY OF. — Known as the *Lyceum Hosianum,* was founded in 1568, owing its name to Stanislaus Hosius, Bishop of Ermland, who established a Jesuit college at Braunsberg in 1565. The institution died out early in the nineteenth century, but was reëstablished in 1818 at the instigation of Prince Joseph of Hohenzollern by a cabinet order of King Frederick William III of Prussia. The faculties of theology and philosophy alone are represented, the institution numbering only a dozen instructors and about 40 students. The library contains 25,000 volumes, and the annual expenditures amount to about $15,000. R. T.

BRAY, THOMAS (1656–1730). — Founder of charity schools and parochial libraries in England and the British colonies; born in Shropshire (1656) and educated at Oswestry School and Oxford; took orders in the Church of England; in 1695 appointed by the Bishop of London (Compton) as his Commissary for church business in Maryland. While engaged in seeking for missionaries for work in Maryland, he found it necessary to equip selected candidates with books, and obtained the help of several bishops in providing libraries for the clergy in that colony. He next projected a scheme for establishing similar parochial libraries in every rural deanery throughout England and Wales. Bray's first colonial library was established at Annapolis in 1697–1698. He advocated the establishment of a Protestant congregation for the Propagation of the Faith in North America, *i.e.* an Anglican organization for missionary work, with purposes analogous to the congregation *de propaganda fide* of the Roman Catholic Church. State aid not being forthcoming for this enterprise, Bray laid a plan for the establishment of a voluntary society, which became the Society for Promoting Christian Knowledge (*q.v.*). The first sketch of the objects of this Society — which included charity schools, the establishment of parochial libraries at home and abroad, and missions both to colonists and natives — was submitted by Bray to a small meeting, Mar. 8, 1698–1699. In 1699 Bray sailed for Maryland, but subsequently returned to England to carry out his larger plans for missionary work. In 1701 he obtained from King William a charter for the incorporation of the Society for the Propagation of the Gospel (*q.v.*). He was thus the father of the two oldest societies of the Church of England. In 1709 his efforts led Parliament to pass an Act "for the better preservation of Parochial Libraries in England." He devoted himself till his death in 1730 to the organization of charity schools in England, the foundation of clerical libraries, and the provision of schools for the negroes in North America. The charity schools (*q.v.*) which Bray was chiefly instrumental in establishing in England were the outcome of a wave of educational enthusiasm which especially influenced the High Church party in the Church of England. During the first 30 years of the eighteenth century, they rapidly increased in number, and received the warm support of Joseph Addison (*q.v.*) and other friends of religious toleration and social reform. The progress of the movement, however, was arrested, partly by the collapse of the political influence of the High Church party after the death of Queen Anne, and partly by the ignorance and incompetence of many of the teachers chosen for service in the schools. A large number, however, of the charity schools established at this period have continued their work to the present day, though all of them have been reorganized and placed upon a new financial and educational basis, through the reforms in English elementary education since 1848.

M. E. S.

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BRAZIL, EDUCATION IN. — Brazil, republic; population, 19,910,646 (estimated 1907). Capital, Rio de Janeiro; population, 811,265. In 1890 the population was composed as follows: 6,302,198 whites; 4,638,495 Métis; 2,097,426 negroes; 1,295,796 Indians.

Historical. — The history of Brazil as a dependency of the crown of Portugal covers a period of three centuries, beginning with the arrival of Pedro Alvarez Cabral, who took possession of the country in the name of the King of Portugal in 1500, and ending with the declaration of independence in 1822. During this colonial period, the Church and religious orders established schools and missions of the same character as those in the neighboring Spanish colonies. A few zealous missionaries penetrated to the interior of the country, but, as a rule, the efforts of missionaries and teachers were limited to the coast region.

A memorable event in the later history of the colony was the arrival of King John of Portugal, who with the royal family fled before the advancing army of Napoleon and sought refuge in his American possessions. The presence of the Portuguese court gave peculiar prestige to Rio de Janeiro, and the influence of the King excited an interest in intellectual pursuits. Recalled to his kingdom in 1812, he left his historical library as a souvenir of his exile, and this became the nucleus of the great library at Rio de Janeiro.

When the King returned to Portugal he left his eldest son Dom Pedro as regent of Brazil, and the following year the independence of the country was proclaimed with Dom Pedro as constitutional Emperor. In 1831 he abdicated in favor of his son Pedro, then a child of 6 years of age. A regency was formed, but the majority of the prince was early declared, and in 1840 he began his reign, which continued till the Republic was proclaimed. Under the leadership of this remarkable sovereign a law was passed (1871) providing for the gradual emancipation of the slaves. The final extinction of slavery was due to an irresistible popular movement; above 200,000 slaves were freed by private owners; two states, then called provinces, Maranhao and Ceara, emancipated their slaves before the system was abolished throughout the land by a unanimous vote of Parliament, May 13, 1888, and the nation made a grand forward movement in the cause of humanity and liberty.

By the constitution adopted in 1824 Brazil was organized as a confederacy of twenty states and one federal district in which the capital, Rio de Janeiro, is situated. Each state was given control of elementary and secondary education, but the direction of higher education throughout the country and the entire control of education in the federal district were reserved to the federal government.

In 1827 a law was passed authorizing the establishment of public primary schools in all the cities and towns and most populous places in the country. But little progress was made in the application of the law, even in the cities. The first decisive step in the matter was taken in 1851, when the Chamber of Deputies gave full power to the government to reorganize the system of elementary education in the federal district. This action was rendered effective by a decree of Feb. 18, 1854, and from this time public education has made progress in the capital and in the coast states, and has been gradually extended in the states of the interior, following the lines of railroads, of which the first was opened to traffic in the year the decree was issued.

Present System. — The transition from a monarchy to a republic was followed by the adoption of a new constitution (1890) which reaffirmed the existing provisions regarding education and declared further that primary education should be free and secular. The central administration of education was organized under a cabinet officer, at present the Minister of the Interior, who bears also the title of Minister of Public Instruction. During this revolutionary and organizing period there was a strong centralizing tendency or disposition to increase federal control, but the states jealously guarded their constitutional rights. While, however, each state acts independently in respect to primary education, there is theoretically, at least, an approach to a common school system throughout the republic. State control is exercised by a superintendent or director, assisted by general inspectors; local school committees are formed for cities and districts; local inspectors are generally employed; courses of study and the qualifications of teachers and the mode of their appointment are determined by official regulations; and in all the states primary schools are supported by state and municipal appropriations. Several of the states have made education compulsory, and in St. Paul a law was passed in 1895, fixing penalties for failure to comply with this requirement. On account, however, of the widely scattered population, the indifference of parents, and the consequent inability to enforce the compulsory provision, it has been generally disregarded. At present efforts are being made to give effect to the principle in the federal district and in the states of St. Paul and Minas.

The primary school where fully organized comprises two divisions, the elementary primary for pupils 7 to 13 years of age, and the higher primary for pupils 13 to 15. The course of study for the elementary primaries includes the Portuguese language; the metric system, elements of geography and history, especially of Brazil; introductory lessons in physical science and natural history; moral and civic instruction; drawing, elements of music; gymnastics and military exercises; manual training for boys, and needlework for girls; practical ideas of surveying. The course for the higher primaries adds to the above studies elements of French; higher arithmetic; elementary algebra; geometry and trigonometry; elements of physical science and natural history as applied to industries, agriculture, hygiene, elements of national law and political economy; drawing, ornamental, mechanical, and topographical.

This wide range of studies must be regarded rather as the expression of a liberal purpose in respect to popular education than of actual achievements in the brief period of primary instruction. The higher primary schools, and the trade and commercial schools, which are usually correlated with the primary schools, afford opportunity for adapting the programs to the age and mental capacity of pupils.

It was undoubtedly the intention to make the school system of the federal district a model for the several states, and to a certain degree this purpose has been realized. The capital city has many elementary primary schools, well graded and admirably equipped. In a few schools, which are maintained as models, boys and girls are taught together, but, as a rule the schools are for boys exclusively or for girls exclusively. The latter number 140 as against 52 schools for boys, a difference probably arising from the fact that the majority of boys begin their education in the preparatory classes of secondary schools. The race prejudice apparently does not exist, as both white and colored children are found in the same classes. The chief difficulty in the conduct of the schools even in the capital arises from the very irregular attendance which it seems impossible to prevent, notwithstanding the fact that 15 school inspectors are engaged in the city service.

A somewhat marked feature of this municipal system is the absence of higher primary schools which are flourishing in several other cities and especially so at St. Paul. This is an important matter because the higher primary schools afford pupils an adequate preparation for the primary normal schools to which candidates are admitted at 15 years of age. While wanting in this important intermediate grade, Rio is well supplied with secondary schools, public and private, and there is also a highly developed professional or trade school maintained by the city. The latter is a boarding school with separate departments for boys and girls, and is completely gratuitous. The boys are admitted at 12 years of age, after passing through the primary school, and are taught cabinet making, carpentry, and printing. Girls are admitted at 7 years of age, and receive primary instruction before entering upon the industrial training, which includes dressmaking, embroidery, and cooking. From the fact that preference is given to orphans in selecting from applicants for vacancies in the girls' department, the latter has become a kind of orphan asylum.

Training of Teachers. — Normal schools are maintained in all the states of Brazil and, as a rule, are situated in the chief cities and provided with truly palatial buildings. The theory of professional training is highly developed, and the normal schools are progressive and thorough. The course of instruction and training covers 4 years, including work in the practice school. The normal school at St. Paul comprises a maternal school, a primary school for both sexes, complementary or higher primary schools, and two normal sections, one for men, the other for women. The normal school at Rio was limited to women until 1900, when the examination was thrown open to young men also.

The pedagogium is a national institution created primarily to carry out the reforms in education initiated by Benjamin Constant, but it has become a general center of influence comprehending in its scope all doctrines and grades of education. The institution publishes a magazine entitled *Revista Pedagogica*, and other works relating to educational matters. It holds evening sessions for disseminating information respecting agricultural science, pedagogy, natural history, and moral and civic education, as well as conventions of literary men and well-known professors. It is located in the building of the Academia Braziliera do Letras, founded to foster the national language and literature.

Auxiliary Agencies. — Besides the public schools maintained by the states, there are many schools established by the religious orders, which have exercised a marked influence upon public education. In St. Paul the official regulations for the conduct of the schools and the programs of instruction bear the impress of the Paulist fathers, who have been active in the general cause of education. In the same state there are many foreign schools, especially Italian, some of which are independent and others are supported by Italian societies. Their main object is to preserve and foster devotion to Italy, but except for a slight surveillance by the Brazilian authorities, they are not interfered with.

Secondary Education. — Secondary schools maintained by public funds and controlled by public authorities are found in the chief cities of Brazil, but private secondary schools, secular and clerical, are preferred by the majority of the people who are able to give their children liberal education. This is due in part to religious sentiments but more particularly to the fact that the private colleges are boarding schools, generally situated in the country, and therefore they attract the patronage of the great rural proprietors.

The national gymnasium of Rio de Janeiro, which is under the direction of the federal government, and the state college of St. Paul are the highest types of public secondary schools in Brazil. They are well organized, and offer extensive courses of study. The program of the national gymnasium, which may be taken as a model, is arranged for 7 years, and includes two modern languages, *i.e.* French and either German or English, which are pursued throughout the course; 6 years' study of Latin, and 3 of Greek. The Portuguese language and literature are studied from the first to the seventh year. The program is equally extensive on the side of mathematics and the sciences. Pupils may enter the institution between the ages of 11 and 14, and those who finish the course and successfully pass the required examinations receive the diploma of graduation which admits them to the higher institutions. This is a privilege of all the public secondary institutions and of the private colleges that submit to government inspection. The public commercial school of Rio de Janeiro corresponds to the modern secondary or commercial high schools of the United States.

The General Situation.— In general it may be said that the basis of a comprehensive system of education has been laid in every state of the republic. At the same time, little progress has been made outside of the chief cities and the surrounding districts. This is indicated from the fact that only about 3 per cent of the total population of Brazil attend school. The causes of this backward condition are to be found in the vast extent of the country, the tropical climate of the larger portion, and the mixed character of the population. The Portuguese present the extremes of high culture and apathetic ignorance, and the Indians and negroes show the same traits in Brazil as in the United States. The latter are represented in the list of graduates from secondary schools by some really brilliant students; but, in general, they help to swell the mass of the illiterate. Thus far the provision for popular education has been the work of leaders unsupported by public sentiment or customs; at the present time there are indications that the people themselves are awakening to the importance of the subject. One sign of this interest is found in the recent endeavor on the part of the bureau of general statistics to secure complete returns of primary and secondary education throughout the republic.

From the report of this investigation it appears that in 1908 there were: 1815 public municipal schools, 7089 public schools under state control and mostly in the smaller towns and villages, and 2243 private schools, most of which were in the larger towns and cities. The state schools had a total enrollment of 348,327 and an average attendance of 240,690; the public municipal schools had an enrollment of 106,754 and an average attendance of 69,432. Private primary schools had a total enrollment of 110,841 and an average attendance of 81,066. Of the 327 institutions of secondary education 29 were public and 298 private as to control; the former had an enrollment of 4031 and the latter 26,258.

Commenting on these returns, the report says: —

> "In the case of the Federal District, where the population is almost entirely urban, there is a population of 858,000 and a school enrollment of 61,933 [7.2 per cent], while the State of Alagoas, with a population almost as great and with the exception of a few coast towns altogether rural, has a school enrollment of 14,092 [1.6 per cent]. The State of Pernambuco, with a population almost entirely rural, with the exception of the capital, Recife, has a school enrollment of 22,852, the total population being 1,310,000."

Higher Education. — There is no university in Brazil, and higher education is represented by specialized faculties and technical schools, following the system advocated by the French revolutionary leaders and long perpetuated in France by the Napoleonic System.

The principal faculty or school of medicine and pharmacy is located at the capital, and has the additional advantage of connection with the magnificent hospital of the Misericordia, which offers unsurpassed advantages for clinical study and practice. The two remaining schools of medicine and pharmacy are situated, respectively, at Bahia and Porto Alegre. The law faculties are at St. Paul and Pernambuco. The diplomas conferred by these several faculties entitle the recipients to practice the professions to which they pertain in any part of Brazil.

The Polytechnic Institute at Rio de Janeiro offers a general course, which all students must attend, and five special courses; students who pursue these and pass successful examinations may receive a degree of bachelor in physical or mathematical science, or certificates as civil, mining, industrial, mechanical, or agricultural engineers. The school of mines, situated at Ouro Preto in the state of Minas Geraes, educates engineers for mining and metallurgical works and for the various branches of civil engineering. The plan of studies comprises a fundamental course and a special course. For admission to the latter, the candidates must present a certificate of efficiency in the studies of the fundamental course of this school or proof of similar studies in the polytechnic, military, or naval schools, or in foreign schools whose grade is similar. From the most distinguished graduates in the special course the government is empowered to send one or two, at the cost of the nation, to perfect their studies in the United States or Europe. The government also provides for the training of military and naval officers by a graded series of institutions including preparatory and secondary schools, and military and naval colleges. The national academy of fine arts and the national institute of music at Rio de Janeiro and the school of fine arts at Bahia are liberally supported from the public treasury. The distinction which Rio de Janeiro enjoys as a center of scientific activity is due, primarily, to the influence of Dom Pedro II. The Astronomical Observatory at the capital and the Historical, Geographical, and Ethnological Institute bear witness to the breadth of the Emperor's scientific interests, and have kept Brazil at the front in the scientific movement of the age. In like manner the national institute for the education of the deaf and dumb and the national institute for the blind established at Rio testified to the Emperor's practical solicitude for the welfare of his subjects, and early brought Brazil into the humanitarian movement that is a distinguishing mark of modern states. A. T. S.

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BREATHING. — Changes in the rate and intensity of respiration are important as emotional expressions (*q.v.*). The system of muscles controlling the processes of respiration are variously affected in various individuals by different degrees of emotion. Furthermore, there are great individual differences in the habits of respiration. Some persons respire through the use of their intercostal muscles, while others employ chiefly the muscles of the diaphragm. Such activities as laughter and articulation are intimately related to the muscular processes involved in respiration. Breathing is an involuntary form of activity, and consequently not ordinarily considered as an appropriate subject for educational discussion. As an important form of emotional expression it deserves more attention than it has had, and as a form of activity which is readily modified by individual training it should be treated as worthy of definite cultivation and control.

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BREATHING EXERCISES. — Special exercises designed to increase lung capacity have occupied a large place in the various systems of light gymnastics. Among the many forms of breathing exercises advocated, the most commonly used are (*a*) simple breathing with emphasis upon costal or diaphragmatic movements; (*b*) deep inspiration followed by holding the breath as long as possible; (*c*) deep breathing accompanied by arm movements, mainly elevations; (*d*) deep breathing practiced with small tube held between the lips for the purpose of raising intrapulmonic pressure and thereby dilating all the air vesicles; (*e*) forced inspiration followed by forced expiration into spirometer.

The advantages claimed for breathing exercises are increased lung capacity, chest development, and fortification against consumption and other diseases of the lungs. A better understanding of the physiology of exercise has brought about a change of methods in teaching breathing exercises. The labored breathing resulting from vigorous or even moderate exercise in untrained persons gave the impression that this condition was caused by insufficient lung capacity, but the difficulty lies chiefly in the heart, which fails in such cases to adapt itself quickly to the need for rapid circulation of blood through the lungs. Respiratory efficiency is best secured by general vigorous exercise which increases the functional activity of the heart and lungs.

Under these conditions the amplitude and rapidity of respiration are augmented automatically in response to a physiological need for increased absorption of oxygen and elimination of carbon dioxide. Very little benefit results from the practice of voluntary deep breathing exercises unless accompanied by fairly vigorous exercise, because the blood will not absorb more oxygen from the air in the lungs unless more oxygen is needed in the muscles as a result of increased activity. The greatest value in breathing exercises is in aiding the gradual readjustment of the respiration and circulation after vigorous exercise which ceases abruptly. G. L. M.

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BREMEN, FREE TOWN OF, EDUCATION IN. — See German Empire, Education in.

BRENAU COLLEGE — CONSERVATORY, GAINSVILLE, GA. — Founded in 1878 as the Georgia Baptist Seminary for Young Ladies. In 1886 it became a private proprietary school for girls. Primary, preparatory, collegiate, and fine arts departments are maintained. Students are admitted by certificate of an approved school or by examination with requirements equivalent to about 8 points of high school work. Eight degrees are conferred on the completion of the appropriate courses. The college has a faculty of 14 instructors.

BRENZ, JOHANN (1499–1570). — A prominent educator of the German Reformation period. He was born in Weil in Suabia and educated for the priesthood, but as early as 1522 joined the party of Luther. His work for the erection and reorganization of schools, both lower and higher, in Würtemberg was of great value. He wrote a large catechism (*Catechismus pia et utili explicatione illustratus*, 1551), and helped to draw up the Würtemberg School Regulation of 1559, one of the most important and most widely imitated German school regulations in the sixteenth century. It provided for a complete school system under state control. (Consult bibliography in Mertz, *Das Schulwesen der deutschen Reformation*, p. 82.)

BREREWOOD, EDWARD (d. 1613). — Mathematician and antiquary, was the son of a wet glover at Chester, and was educated in grammar learning in that city. He was of Brasenose College, Oxford, and took his M.A. degree in 1590. In 1596 Brerewood was appointed First Professor of Astronomy in Gresham College, London. Wood (*Athen. Oxon.* ed. 1815, Vol. II, col. 139) says: " He was ever most ready in private, either by conference or writing, to instruct others, repairing unto them, if they were desirous of his instruction in any doubtful points of learning, within the ample circuit of his deep apprehension."

Brerewood wrote a number of books, which relatively to the times may count as considerable research. Amongst these were treatises on the Sabbath (1630) and a *Declaration of the Patriarchal Government of the Ancient Church* (Oxford, 1641). He wrote Latin commentaries on the first four books of Aristotle's *Ethics* (Oxford, 1640). His more educational works were the following: —

1. *De Ponderibus et pretiis veterum nummorum, eorumque cum recentioribus collatione.* (London, 1614.) This had the honor of being incorporated in the great Polygot Bible of Brian Walton, 1657, and also in the *Critici Sacri*, 1660, edited by John Pearson, Anthony Scattergood, and Francis Gouldman.
2. *Enquiries touching the Diversities of Languages and Religions through the chief parts of the World.* (London, 1614.)
3. *Elementa Logicae in gratiam studiosae iuventutis in academia Oxoniana.* (London, 1614.)
4. *Tractatus duo: quorum primus est de meteoris, secundus de vento.* (Oxford, 1631.)

F. W.

BRESLAU, SILESIA, THE ROYAL UNIVERSITY OF. — One of the few German universities that does not include in its title the name of a ruler; it owes its present status to a consolidation effected in 1811 under King Frederick William III of Prussia of the University of Frankfort-on-the-Oder, established in 1506, and the *Leopoldinische Universität* in Breslau, founded in 1702 by a "golden" bull of the Emperor Leopold I. The latter institution owed its origin to a Latin school organized in the city of Breslau in 1638 in connection with a Jesuit mission, the school being in the course of time transformed into a gymnasium. Before its consolidation with the University of Frankfort-on-the-Oder and its consequent reorganization, the University of Breslau performed the functions of a Catholic theological seminary, but later became the first university in Prussia to include faculties of both Catholic and Protestant theology. In addition it comprises the remaining traditional faculties of law, medicine, and philosophy, deriving much of its importance from the fact that it is located in the intellectual center of eastern Germany. Breslau is especially well supplied with clinics, and also devotes considerable attention to instruction in agriculture. A technological school is being organized in the city. The university library includes 350,000 volumes and 3700 manuscripts, while the city library contains 160,000 volumes and 4300 manuscripts. The university is also closely associated with the Royal Archives, the official depository for the records of Silesia, containing at present about 85,000 documents. The annual budget approximates $475,000. Among former professors of eminence may be mentioned Stobbe in law, Purkinje, Cohnheim, and Foerster in medicine, Stenzel and Neumann in history, Westphal in classical philology, von der Hagen, Hoffmann von Fallersleben, Gustav Freytag (*q.v.*), Heinrich Rückert in Germanic philology, Kölbing in English philology, Bunsen in chemistry, Kirchhoff (*q.v.*) in physics, Göppert in botany, Cohn in bacteriology. From the standpoint of student attendance it is the fifth largest university in Germany, being exceeded only by Berlin, Munich, Leipzig, and Bonn. During the winter semester of 1909–1910 there were enrolled 2359 students, distributed as follows: theology 349 (of these there were about three times as many in Catholic as in Protestant theology), law 560, medicine 414, philosophy 1036. In addition there were 400 auditors enrolled. R. T.

BRETHREN OF THE COMMON LIFE. — An organization which originated in Holland in the fourteenth century, and had the greatest influence in religious and educational reform. The order arose as a reaction against the decline and moral laxness of the clergy and the begging orders. Its original purpose was to unite together men of piety in one house in order to reduce the expenses of living by contributing to a common fund. The members were not bound by vows or rule. They were clerics *extra religionem* (not bound by religious vows). Self-restraint, humility, and love were demanded from all, but any member could leave when he pleased. The man who inspired the establishment of the order was Gerhard Groote. Born at Deventer of wealthy family in 1340, he studied at Paris, and on returning to his home was intrusted with a mission to the Pope at Avignon. As a reward he was presented with two rich prebends at Cologne, which he used to live the ordinary irresponsible life of the clergy of the time, and became known more for his foppishness than anything else. In 1374 he was suddenly converted, and sought the advice of the mystic Ruysbroek. As a result he renounced his worldly possessions, surrendered his house to the use of poor women who wished to consecrate themselves to the service of God, and, reserving but one room for himself, he retired to a life of inward spiritual meditation. In 1380 he came out from his retirement and began to preach throughout Holland in the vernacular, attacked the abuses of the clergy, and soon gained a large spiritual following. His labors, carried on amid great opposition, were cut short by his death in 1384. During his retirement Groote had read assiduously. It was in order to satisfy his need of material that he exchanged Mss. and hired poor scholars who flocked to the school at Deventer to copy them, and was also assisted by men "of good will," lay and ecclesiastic. Among these was Florentius Radewynius, himself a graduate of the University of Prague, and attached to the Church of St. Lebuinus at Deventer. In 1371 Florentius made the suggestion that the copyists should place their earnings in a common fund and live together. With some reluctance, since he feared the opposition of the mendicant orders, Groote agreed, and a trial was made. Florentius gave his house for this purpose, and soon another was added. Here the copyists lived together and followed a regular routine, dividing their time between writing and praying and discussing questions of religious moment. To these discussions (*collationes*) many citizens resorted, until it became necessary to hold them in the open. The greatest ability was shown in the copying of Mss., not only of sacred but of literary and classical content, with the result that the price of Mss. went down at that period. Gregory XI approved of the order, and soon many houses were established in the Netherlands and Germany.

To this account, as so far given, all authorities agree. Some doubt was, however, cast on the educational work and influence of the Brethren. It was claimed for a time that the order undertook educational activity from its origin. But K. Hirsch in the *Realenzyklopädie für Protestantische Theologie und Kirche* (2d ed.) not only attacked this view, but denied that the Brethren exercised any influence at all on education. His argument, however, rests on but one authority, who has been proved to be incorrect. Hirsch points out that the mistake arose through the confusion of Florentius Rodoginus, who had charge of the school at Deventer, with Florentius Radewynius, the friend of Groote. It is highly probable, however, that the two were one and the same man. In any case there is the authority of Erasmus, Melanchthon, Badius, Buschius, and many others, as well as the title *Fratres Scholares*, by which the Brethren were also known, to prove that they were associated with the education of northern Europe; but this connection was a late development.

At the time of the foundation of the order the schools in the Netherlands and Germany were of three types, monastic or cathedral, parish, and municipal schools. Poor scholars came from a distance, and had to endure the greatest hardships to maintain themselves by begging and menial work. Among them were many who could make no progress in the scholastic disciplines and abstruse disputations of the time through inability to read or write. Furthermore, the school made no attempt to exercise any moral control over their pupils, with the result that they ran riot. It was in the latter direction that the Brethren first turned their attention. In order to enable the poor scholars to maintain themselves, they provided them with the work of copying Mss., and hostels (*q.v.*) were opened for them; they looked carefully after the moral welfare of their charges. To the backward they gave tuition to enable them to benefit by the school work. Many of these tutors became so able that they were invited to teach in the schools, with the result that their influence among the pupils was extended. Thus, while they had no schools of their own, the Brethren took a deep interest in the schools at Deventer, Zwolle, Utrecht, Groningen, Gouda. At Deventer, for example, Sinthius, the teacher of Erasmus, was a member of the order; at Zwolle, Cele, the rector, while not a member, stood in intimate relations with the Brethren. At the latter place the Brethren had two houses, one for older boys who taught in the lower school, and one for poor boys whose studies and moral training they supervised. Soon the success of the Brethren attracted attention, and they were invited to take full charge of schools or to open new institutions. Thus the Brethren were summoned from Delft to Utrecht, from Herzogenbusch to Nijmegen, while the school at Herzogenbusch was taught by Brethren called from Zwolle; in 1460 they opened a school at Brussels. Standonkh, at one time rector of the University of Paris, opened 4 schools under the charge of the order (Louvain, Mechlin, Cambray, and Valenciennes). Thus by the end of the fifteenth century the whole of the educational system of northwestern Europe was under the influence of the Brethren. Buschius enumerated 50 schools in 1470.

The educational influence of the Brethren cannot be too highly valued. In their work were blended together the strivings of northern Europe for religious reform and the literary renaissance of the South. From them came the ideal of the "cultured Christian gentleman," who combines a love for literature with mystic devotion (*pietas literata*). In place of the old scholastic domination they introduced a more liberal curriculum; in place of the previous unorganized and uncontrolled assembly of pupils under constantly changing teachers, they established the school as it is now known. The best account of a school under the management of the Brethren comes from Sturm's report to the Magistrates at Strassburg in 1538. Sturm had himself been a pupil at the school in Liège. The school had a rector who divided the scholars into classes which were placed under class teachers; the upper classes usually were taught by specialists; he prescribed the readings for each class, and looked after the general progress, moral and intellectual, of the pupils. The classes were further subdivided into *decuries* or groups of ten under the charge of monitors. The masters were among the best teachers of the day. In addition to the Brethren, men of distinction were summoned from Paris and Prague universities, and, since the schools were always well attended and the salaries were good, there was introduced a stability and continuity in the lives of teachers and taught. Among these teachers may be mentioned Hegius, Sinthius, Cele, Macropedius, and Despauterius, the author of a grammar which for two centuries superseded that of Alexander de Villa Dei (*q.v.*). The lower classes were sometimes taught by senior students. The schools were divided into two sections, elementary, for reading, writing, arithmetic, and grammar, and classical, for Greek, rhetoric, dialectic, and other humanities. Even modern subjects, such as history and geography, were introduced. There were from six to eight classes in each school. The discipline was rigorous, but good work and conduct received recognition in the shape of prizes. Demosthenes, Plato, and Aristotle in Greek, Cicero, Cæsar, Vergil, and Horace in Latin were included in the readings, while considerable attention was paid to the Scriptures. A play of Terence was performed by the pupils. "Nor do I see," says Sturm, "how that infrequency of studies can be avoided and removed throughout Germany except by an education of this type in early youth." And the Brethren were successful in inaugurating a reform which is comparable to that of Arnold at Rugby, and certainly had a greater influence. Scarcely a name can be mentioned among the northern European scholars who was not affected directly or indirectly by them — Thomas à Kempis, Rudolf Agricola, Buschius, Erasmus, Sturm, to mention only the more important. From Holland their schools spread to Westphalia, and thence over the Rhine to Alsace, where the flourishing towns of Schlettstadt and Strassburg became important centers of culture on a religious basis (*pietas literata*).

To sum up, the Brethren cared for the poor scholars, introduced grading of schools, new textbooks, the Renaissance studies, copying and later printing of books, the elements of modern subjects, and more or less permanent instruction in the schools. The introduction of printing took away a considerable source of revenue from the houses of the Brethren, while the Reformation dealt a deathblow to their activities. Their houses were shut up, their schools either declined or were taken over by municipalities. By the seventeenth century nearly all had disappeared; the last of all, the house of the Brethren at Emmerich, continued until 1811.

I. L. K.

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Herzog. *Realenzyklopädie für Protestantische Theologie und Kirche,* 2d ed., *s.v.* Brüder des gemeinsamen Lebens.

BRIDGES, NOAH. — A schoolmaster of the seventeenth century. He had studied at Balliol College, Oxford. Took B.C.L. in 1646, and was Clerk of Parliaments at Oxford, 1643–1644. In 1653 he kept a private school at Putney, where, he says in his prospectus, "is taught the Greek and Latin tongues; also arts and sciences Mathematicall, viz., Arithmetique, Fair Writing, Merchants' Accounts, Geometry, Trigonometry, Algebra, etc." His school was therefore a private grammar school, with a leaning to what are called the "modern subjects." In the earlier private schools, ordinarily the subjects taught were those excluded from the good public grammar school, *e.g.* writing, arithmetic. The value of the private school for these subjects apparently induced good teachers to increase the curriculum, so as to encroach on the curriculum of the public grammar school, and eventually to become competitors of the endowed schools, and it is noticeable that many of the improvements in teaching of method in the English schools were initiated in these private schools. In 1653 Bridges published his *Vulgar Arithmetique* "peculiarly fitted," as he claimed, "for merchants and tradesmen, made useful for all men, familiar to the meanest capacity; and for the public good laid down in a school method." De Morgan praises Bridges' book especially for its explicit account of the modern method of division. Bridges also wrote on stenography and cryptography. F. W.

BRIDGEWATER COLLEGE, BRIDGEWATER, VA. — A coeducational institution owned and controlled by the Church of the Brethren. Academic, collegiate, normal, musical, and commercial departments are maintained. The college courses leading to degrees are based on about 12 points of high school work. There is a faculty of 16 professors and instructors.

BRIDGMAN, LAURA (1829–1889). — The first deaf and blind person in the United States to receive a formal education. At the age of 18 months she lost sight and hearing. When 8 years old she was taken to the Perkins Institution for the Blind, and by means of the embossed letters she received, under the direction of Samuel G. Howe, a general literary education. She acquired some skill in piano playing, and considerable dexterity in needlework and other household duties.

W. S. M.

See Deaf-Blind, Education of.

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BRIGGS, HENRY (1561–1630). — A distinguished mathematician, born at Halifax in Yorkshire, England, 1561. He was a scholar of St. John's College, Cambridge, and took his M.A. degree in 1585. He became First Professor of Geometry in Gresham College on its foundation in 1596 and in 1620 became First Savilian Professor of Geometry. He was thus the first professor in the first two professorships in geometry, established in England. Briggs is noteworthy as an opponent of astrology in days when the subject was currently accepted. He recognized the value of Napier's work on Logarithms, in the making of practical computations, and in 1616 urged Napier to use a decimal base, on which Napier acted. The *Arithmetica Logarithmica* of Briggs and of Vlacq in extension of Napier's tables has held a unique position. Mr. Ball is of opinion that the introduction of the decimal notation was due to Briggs. See the article on Logarithms. F. W.

BRIGHAM YOUNG COLLEGE, LOGAN, UTAH. — Opened in 1878 as a coeducational institution controlled by the Church of the Latter-Day Saints. Preparatory, collegiate, normal, musical, business, domestic science, and mechanical arts courses are offered. The work of the college is open to graduates of the state district schools, or those who pass the necessary examination in the common school branches. No degrees are given.

BRIGHTLAND, JOHN. — The writer of *A Grammar of the English Tongue . . . making a compleat System of an English Education for the Use of the Schools of Great Britain and Ireland.* (London, 1712.) The significance of Brightland's book consists in the recognition that the study of Latin grammar was not considered by him as necessary to the knowledge of English. If Greek and Latin are assumed as necessary to the study of English grammar, Brightland argued that the greater part of mankind would be doomed to "spare ten or eleven years in learning dead languages," before beginning their own. Our language is indebted to Greek and Latin, but it is also indebted to Spanish, Italian, High and Low Dutch, French, Old (*i.e.* Anglo-Saxon), Welsh, Runic, Gothic, and Icelandic, but no one thinks it is necessary to acquire these before we can begin English. The effect of the Port Royalists (*q.v.*) can be traced on Brightland. He not only treats of English grammar, but is also able to include a treatise on the Art of Poetry, so as to open up to Englishmen the art of poetry, "as the Greeks and the Romans did and the French nation does at present." So, too, the English scholar, who has English grammar as his center instead of Latin and Greek, may be led to rhetoric and logic, and Brightland provides him with treatises on these subjects. The poet-laureate of Queen Anne's reign, N. Tate, supplies a prefatory poem on the excellence of Mr. Brightland's suggestions for an English education. Tate suggests: —

> "To Grecian Hills our Youth no more shall roam,
> Supply'd with these Castalian Springs at Home."

And Isaac Bickerstaff, Esq., declares in an *Approbation* that Brightland's *English Gram-*

mar has done that justice to our language which " till now, it never obtained." F. W.

BRIGHTNESS. — By the brightness of a color sensation is meant technically its equality to a particular gray of the achromatic series (*q.v.*), when its special color tone is abstracted from. An increasing degree of brightness of any color would correspond, therefore, with grays progressively approaching white, a decreasing brightness with grays progressing toward black. One may have, thus, different colors of the same brightness or the same color with different brightnesses. The physical cause of brightness is amplitude or extent of vibration of the ether particles that give rise to the particular color (see COLOR INTENSITY). Change in brightness is usually accompanied by change in saturation (*q.v.*).

R. P. A.

References: —

BALDWIN'S *Dictionary of Philosophy and Psychology*, p. 146; also Art. on Vision.

HOWELL, H. W. *American Text-book of Physiology.* (Philadelphia, 1901.)

SCHAEFER, E. A. *Textbook of Physiology.* (Edinburgh, 1898–1900.)

BRINSLEY, JOHN (date of birth and death unknown).— The educational writer; to be distinguished from his son, John Brinsley, the well-known Yarmouth Puritan divine. He was educated at Christ's College, Cambridge, and graduated M.A. in 1588. He was headmaster of Ashby-de-la-Zouch school (Leicestershire). William Lilly the astrologer was entered as a pupil in 1613 and records that the authors taught by Brinsley were: *Sententiae Pueriles*, Cato, Corderius, Æsop's *Fables*, Tully's *Offices*, Ovid's *de Tristibus*, Vergil, Horace, Camden's *Greek Grammar*, Theognis, Homer's *Iliad*, and an entrance into John Udall's *Hebrew Grammar*.

Brinsley's chief work was the *Ludus Literarius*, or *The Grammar School*, published, first edition 1612, second edition 1627. This work contains a complete account of the educational methods practiced in the English grammar schools of the time, from the lowest to the highest forms, and is the most important statement of the details of school arrangements and organization for the study of Latin grammar, reading of authors, and composition of the Greek language, and school study of Hebrew for the first half of the seventeenth century. A noteworthy feature of the *Ludus Literarius* is the insistence on the teaching of English as well as Latin. Brinsley's reasons are (1) because it is the language which all sorts and conditions of men amongst us must use in speech and writing; (2) purity and elegancy of our own language is a chief part of the honor of our nation; (3) because of those who are for a time trained up in schools, there are very few who proceed in learning, in comparison of them who follow other callings. The outstanding feature of Brinsley's method for the teaching of Latin is a thorough drilling in the preparatory steps for construing. Pupils must always be familiarized with the subject matter of the Latin or Greek which they are to be required to construe. The " hard words " are to be given the pupils by the master. Then the pupil is to inquire (with regard to the passage to be translated into English) " who speaks, in what place, what he speaks, or to what end, when he speaks it, at what time it was, what went before in the sentences nearest, what followeth next after? " Then the pupil is to arrange, or to have arranged for him by the master, the *Latin words in the grammatical order which is required by English construction.* This is Brinsley's distinctive doctrine of translation, though it is not original to him, for he himself acknowledges he took it from Martin Crusius, a German grammarian. He calls the order in Latin, an " artificial " order, *i.e.* an order determined by the standards of the " art " of the Romans. He insists that the pupil must transpose the Latin words to make them take the order of English grammatical construction. This he calls the " natural " order (natural, that is, to the pupil). Having obtained the " natural " order, translation then can proceed *verbatim.* He maintains that this method makes parsing easy and quickly develops translation at sight. To help the pupil Brinsley devised " grammatical translations " for the Latin books read by the pupil in the earliest stages, viz.: *Pueriles confabulatiunculae*, *Sententiae Pueriles*, Cato, Corderius' *Dialogues*, Æsop's *Fables*, Tully's *Epistles*, Tully's *Offices*, together with the *De Amicitia*, *De Senectute*, *Paradoxes*, Ovid's *de Tristibus*, Ovid's *Metamorphoses*, Vergil. Of these, at any rate, the Cato, Vergil's *Eclogues*, Corderius' *Dialogues*, Tully's *Offices* (Book I), Ovid's *Metamorphoses* (Book I), are still extant. He further requires the pupil to be well acquainted with the best commentators on Vergil, Horace, Persius, Juvenal. Brinsley omits from his list the classical historians. In Greek, Brinsley began, as was usual, with the Greek Testament, with which a translation was to be used, Latin or English. He then proceeded to Isocrates, Theognis, Hesiod, or Homer. Elementary Hebrew was also required. Disputations (*q.v.*) were to be conducted in the Latin language on grammatical questions. Religious instruction must be given in the histories of the Bible and on the grounds of religion. Pupils must go to church and take down the substance of the sermon, which must afterwards be written out in good Latin style, and, further, a brief repetition of the whole sermon be made, " without book." Brinsley also supplies chapters on school government, punishments, school times and recreations, diversity of grammars, the relation of the schools to the universities, and a very quaint chapter on " discouragement of Schoolmasters by unthankfulness of parents."

Besides the *Ludus Literarius*, Brinsley wrote:

A Consolation for our Grammar Schooles: or A faithfull and most comfortable incouragement, for laying of a sure foundation of all good learning in our Schooles, and for prosperous building thereupon. More especially for all those of the inferiour sort, and all ruder countries and places, namely for Ireland, Wales, Virginia with the Summer Islands, and for their more speedie attaining of our English tongue by the same labour, that all may speake one and the same language. And withall, for the helping of all such as are desirous speedily to recover that which they had formerlie got in the Grammar Schooles, and to proceed aright therein, for the perpetuall benefit of these our Nations and of the Churches of Christ. London, printed by Richard Field for Thomas Man, dwelling in Paternoster Row, at the sign of the Talbot, 1622. (4to.)

This is a vigorous appeal to all who have charge of schools to read the author's *Ludus Literarius*, and goes over much of the same ground. But it contains an important Appendix, which gives a list of the school textbooks which Brinsley considers the best in each subject. F. W.

References: —

Adamson, J. W. *Pioneers of Modern Education.* (Cambridge, 1905.)

Watson, Foster. *The English Grammar Schools up to* 1660. (Cambridge, 1908.)

BRISTED, CHARLES ASTOR (1820–1874). — Author, educated at Yale College and at the University of Cambridge in England; author of *Letters to Horace Mann* and *Five Years in an English University.* W. S. M.

BRITISH AND FOREIGN BIBLE SOCIETY. — This organization was founded in 1804 on the suggestion of a member of the Committee of the Religious Tract Society, when the subject of the want of Bibles in Wales was brought up by a Welsh clergyman, Rev. Thomas Charles. The Society at once succeeded in obtaining support for its object, to bring the Bible within the reach of the destitute of all lands. For this purpose the society has issued translations of the Bible into about 350 languages and dialects of the world. This society was the parent of many others in Europe and the United States.

Reference: —

Canton, W. *History of the British and Foreign Bible Society.* (London, 1904.)

BRITISH AND FOREIGN SCHOOL SOCIETY. — An organization which arose out of a society founded by Joseph Lancaster (*q.v.*) and two of his supporters in 1808 " for the purpose of affording education, procuring employment, and as far as possible to furnish clothing to the children of the poorer subjects of King George III." This society was organized for two other purposes, which were, however, soon dropped. There were soon attracted to it men who had an earnest and intense interest in education and who were liberal in their religious views. They combined to support and spread the monitorial schools of Lancaster. Capital was raised, and subscriptions came in from all parts. Lancaster was relieved of his duties at his school, and made a successful propagandist tour of the British Isles. In 1810 the financial support was increased, and men who were then prominent in all walks of life joined the society. In 1811 the National Society for Educating the Poor in the Principles of the Church (*q.v.*) was established on a denominational basis, but failed to withdraw any support from the other society. From 1812 to 1814 the society was involved in quarrels with the shiftless Lancaster, and in 1814 the final separation with Lancaster took place. In the same year the title *The British and Foreign School Society* was adopted. The society had now the patronage of the Crown, and enjoyed the active assistance of members of the Royal Family. The aim of the society was to encourage the formation of local committees to found schools, to train teachers for all parts of the world, to maintain the voluntary basis, and above all to teach the Bible in the schools on undenominational lines. The Society took over the Borough Road School which Lancaster had founded; a girls' school and an institution for women teachers were opened, and work was done in foreign parts. When a committee reported on the unsatisfactory nature of the training of teachers, which was entirely mechanical and very limited in scope, reading, writing, history, and geography were ordered to be taught. Local subcommittees sprang up in many places, but large parts of England remained untouched. Auxiliary societies were established to obtain information as to local needs, the population, the number of the poor, and the educational facilities. Schools were to be established for which the central society promised aid. For the purpose of propaganda work a *Manual* was published in 1816 and was soon translated into foreign languages. New textbooks were published, and a depository was maintained from which books and school materials were sold at cost price. At the Borough Road School, teachers from all parts of the world were being trained. The Society had its agents and representatives in Scotland, Ireland, Canada, India, all parts of Europe, and in Washington (Robert Ould). It was only in Catholic countries that the Society failed to meet with continued success. In 1830 the Society was in a position to appoint propaganda agents and inspectors of schools. The Reform Bill riots still further emphasized the need of increasing schools in the agricultural districts, and the Society offered assistance to rural teachers. In 1834 state aid was given for the first time, but the method of allotment was so poor that support was not given where the needs were greatest. In 1842 the normal school at Borough Road was rebuilt under the inducement of an offer of aid from the Treasury to training schools for teachers. About this time great anxiety was caused to the Society by the unsatisfactory report made on the British schools by the government inspector. In 1847 the old monitorial system was abolished, and pupil and assistant teachers were appointed. In 1847–1849 the Society was torn by disputes concerning the acceptance of state aid, since it was feared that this might endanger the voluntary principles and the undenominational Bible teaching for which the Society stood. Between 1855 and 1880 the Society established five normal schools at Bangor, Stockwell, Darlington and Saffron Walden and Swansea. In 1875 the Society contributed largely to the improvement of the education of infants by doing propaganda work for the Froebelian System and establishing a kindergarten. The Education Act of 1870 was a vindication of the principles for which the Society stood, and was brought about largely through the efforts of men who then or later became members of the Society.

With the increase of national and popular control of education the function of the Society is gradually disappearing. For English educational development it did a great service through collecting reports and through general propaganda work. The Society, which was incorporated by Letters Patent in 1906, still supports about 1500 schools, but its chief work is in the training of teachers for elementary schools. Apart from serving as a rallying point for those who desire to retain the Bible in the schools, the Society by a resolution of 1907 proposed to employ its funds for the "propagation and encouragement of agencies for the education and training (physical, social, and moral) of youths of both sexes during the period of rapid development which succeeds the age of childhood and primary school." This will provide the society with a sphere of work as important as that which it so successfully undertook at its inception a century ago.

See LANCASTER, JOSEPH; TRAINING OF TEACHERS IN ENGLAND; BIBLE IN THE SCHOOLS.

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BINNS, H. B. *A Century of Education*, 1808–1908. (London, 1908.)

BRITISH COLUMBIA, EDUCATION IN. — See CANADA, EDUCATION IN.

BRITISH GUIANA, EDUCATION IN. — See GUIANA, EDUCATION IN.

BRITISH INDIA, EDUCATION IN. — See INDIA, EDUCATION IN.

BRITISH SCHOOLS. — A term formerly applied in England to the elementary schools provided and maintained by the British and Foreign School Society (*q.v.*). It still survives in the names of a few schools.

BROCKETT, LINUS PIERPONT (1820–1893). — Educated at Brown University and Yale College; several years professor in Georgetown College; author of *History of Education*, which was published under the pseudonym "Philobus." W. S. M.

BROCKLESBY, JOHN (1811–1889). — Educator and textbook writer, educated at Yale College; tutor at Yale College (1838–1840); professor in Trinity College at Hartford (1842–1874); author of textbooks on physical geography, astronomy, and meteorology.

W. S. M.

BROOKBANK, JOSEPH (b. 1612). — A schoolmaster and educational writer. Little is known of his life except a few facts. He was a minister and private schoolmaster. (See *Dictionary of National Biography.*) For his parishioners at West Wycombe, Buckinghamshire, he wrote a catechism entitled *Vitis Salutaris, or the Vine of Catechetical Divinitie and Saving Truth.* His educational works are deserving of notice. Among the most important of these are his translations of *Joh. Amos Comenius, His Last Porch of the Latin Tongue*, etc. (the title is both in Latin and English). The translation was made from the Low Dutch translation of the original by Henry Schoof. The work appeared in 1647 and 1657.

Brookbank in his address to the Candid Reader urges that there are *Three Forms or Ranks of Teachers.* "Worth and ability in school-teachers; set them as their scholars in their forms, or ranks; in the highest thereof, are those who have been long approved for their skill, experience and success, in their praiseworthy labours; unto whom here I have nothing to say but χαίρετε. The next are those, who as yet have not either studied, or made trial of school travels, though otherwise able and deserving; but either upon occasion, or otherwise, desire and endeavor to overtake or excede the former; unto whom my advice is, That they would advance their judgment and experience, *By the Reading of Authors for that Purpose*; such as are Plutarch, περὶ παιδων ἀγωγῆς, Quintilian, *Hen. Schori specimen*, Martinius (*Ejus praefationem ante fundamenta Graecae Linguae*), Ascham his *Schoolmaster*, Brinsley his *Ludus Literarius*, and *Consolation to Grammar Schools*, the Preface to our *Latin Grammar*, Mr. Robotham's Epistle before his translation of *Janua Linguarum*, Mulcaster his *Elementary*, and *Positions*, and his Epistle before his *Cato, Christianus*, Vossius, *De Arte Grammatica, Hugonis Grotii et aliorum dissertationes de studiis instituendis*, J. A. Comenii *Prodromus, The ready way to the Latin*

Tongue, etc., attested by Mr. Hartlib. And those who intend to fit themselves for the education of Noble Youth, I commend them to the reading of Sir Thomas Eliot his *Governour*, Sturmius *De Principibus Instituendis*, Orosius *de Principibus Instituendis*, Clerk *de Aulico*, Mulcaster his *Positions*, More's *Principles*, the *Institution of a Gentleman*, Mr. Braithwait's *English Gentleman*, ἡρω-παιδεῖα, or the *Institution of a Young Gentleman* by James Cleland, Petrus Truellius *de Noutechnia*, Possevinus *de Cultura Ingeniorum*, *Heroick Education;* which books, well weighed and digested, will enable an ordinary genius to find out the best way and method for the teaching of this book or any other; unto which, and their own parts, I leave them. The last sort are those of meaner parts, learning, abilities, and experience, unto whom the direction ensuing may be of great use." (Brookbank then proceeds to give good, practical, detailed rules of learning the books.) In addition to this work, Brookbank also published class textbooks on spelling (*An English Syllabary*, London, 1651) and directions on the use of this book and *A Breviate of our King's whole Latin Grammar, Vulgarly called Lillie's*, etc., 1660.

Brookbank gives detailed directions for using his Breviate. He mentions *Two books to be read with the Breviate* "for the perfecting (of pupils) in *Quae Genus* and the *Syntaxis*, let them learn to say without book, and to construe and parse Mr. Leech's Dialogues at the end of his *Grammar Questions* or in Mr. Clark's *Dux Grammaticus*, whereby they may be perfected, in the understanding and practice of all that they have learned in grammar, and in the whole Syntaxis." Brookbank has not been given the attention which is merited by his importance as a textbook writer and his interest in school education. F. W.

Reference: —

Dictionary of National Biography.

BROOKLYN, CITY OF. — Formerly an independent city, but now a part of the City of Greater New York (*q.v.*). Church and private schools were established here early by the Dutch. In 1813, public school district, No. 1 was organized, and in 1816 a Lancasterian school was opened. Other districts were organized, and by 1843, 10 districts had been organized. In that year the legislature consolidated these districts, and established a Board of Education for the city of Brooklyn. In 1853, a city superintendent of schools was elected. In 1854, the city of Williamsburg and the village of Bushwick were consolidated with Brooklyn, and the Board of Education was increased to 45 members. In 1898 Brooklyn united with New York City to form the Borough of Brooklyn in the City of Greater New York.

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Annual Reports, *Superintendent of Public Instruction to the Board of Education of the City of Brooklyn*, 1854–1897.

Palmer, A. E. *The New York Public School*, chs. 23–29. (New York, 1905.)

BROOKLYN INSTITUTE OF ARTS AND SCIENCES, THE. — Founded and incorporated by the legislature of the state in 1824, under the name of the Brooklyn Apprentices' Library Association. On July 4, 1825, the cornerstone of the first building owned by the Association was laid by General Lafayette, at the junction of Henry and Cranberry streets. In 1835 the Association changed its quarters to a more commodious building in Washington Street. Its scope was broadened under an amended charter in 1843, and the name henceforward was the Brooklyn Institute. Among the speakers from its platform were heard "such eminent scientific men as Agassiz, Dana, Gray, Henry, Morse, Mitchell, Torrey, Guyot, and Cooke; such learned divines as Doctors McCosh, Hitchcock, Storrs, and Buddington; and such defenders of the liberties of the people as Phillips, Sumner, Garrison, Emerson, Everett, Curtis, King, Bellows, Chapin, and Beecher." From 1843 to 1867 the work of the Institute was brilliant and remarkable, being largely expanded by two important donations from Mr. Augustus Graham. From 1867 to 1887, however, the work of the Institute was unfortunately crippled for want of funds, so that "the most that it was able to do was to circulate its library, to keep up its classes in drawing, and to provide for the annual addresses on the 22nd of February." The debt was finally paid in 1887; when the assets of the Institute amounted to a value of $136,000 and a library of 12,000 volumes.

During the year 1887–1888 the new policy was adopted of forming an Institute of Arts and Sciences worthy of the wealth and culture of Brooklyn; and by the unions of learned bodies with the Institute, and in other ways, there were formed in 1888–1889 the departments of microscopy, astronomy, entomology, photography, physics, chemistry, botany, mineralogy, geology, zoölogy and archæology. In 1888–1889 were added the departments of architecture, electricity, geography, mathematics, painting, philology, political science, and psychology; and in 1891–1892 the scope of the Institute work was still further broadened by the establishment of the departments of music and pedagogy. The rapid growth of the new Institute of Arts and Sciences, which was completely amalgamated with the old Brooklyn Institute in 1891–1892, may be indicated by the fact that its membership grew from 350 in 1888–1890 to 3457 in 1893–1894; while in 1908 it stood at 6703. The number of lectures and meetings open to all members in 1907–1908 was 488, and the total attendance for the year amounted to 497,445. The receipts of the Institute for the same year, including only moneys available for the payment of current expenses and the purchase of objects for the museum, amounted to $209,894; while the permanent funds stood at $388,541.

The ramifications of the work of the Institute are so many and various that it is impossible to enumerate them. The motto of the institution is "For the people by the people"; and it endeavors to be to Brooklyn what the Lowell Institute, Society of Natural History, and Art Museum are to Boston, what the Franklin Institute, Academy of Science, and Gallery of Fine Arts are to Philadelphia, what the Metropolitan Museum and the American Museum are to New York. P. R. C.

BROOKLYN POLYTECHNIC INSTITUTE, BROOKLYN, N.Y. — An institution founded in 1853, which gives college preparatory training and a college engineering course. The latter course is given during the day and evening, and affords a training for engineers and chemists. About 12 points of high school work are required for admission; certificates of proficiency from the public high schools of New York and other accredited schools are accepted in lieu of examinations. Courses are given in chemistry, chemical, mechanical, civil, and electrical engineering, leading to appropriate degrees. A graduate department is also maintained. There is a faculty of 14 professors, and 27 instructors and assistants. Fred W. Atkinson, Ph.D., is the president.

BROOKS, CHARLES (1795–1872). — One of the coworkers of Horace Mann (*q.v.*) in the revival of the Massachusetts school system, was born at Medford, Mass., Oct. 30, 1795. He was educated in the common schools of Massachusetts and at Harvard College, and engaged in the work of the ministry. He became acquainted with the system of normal schools in Prussia, and devoted several years to the attempts of James G. Carter (*q.v.*) and others to secure the necessary appropriations from the legislature of Massachusetts to establish such institutions. For several years he was professor of natural history in New York University, and he was one of the founders of the American Association for the Advancement of Education (*q.v.*). He was the author of two textbooks on ornithology, *Peace, Labor, and Education in Europe*, and several pamphlets on normal schools. He died at Lancaster, Mass., on the 7th of July, 1872. W. S. M.

BROOKS, NATHAN COVINGTON (1819–1898). — Educator and author of textbooks, graduated from St. John's College in 1837; principal of the Baltimore High School (1839–1848) and first president of the Baltimore Female College (1848); author of a number of Latin and Greek textbooks. W. S. M.

BROOKS, PHILLIPS (1835–1893). — Noted divine and preacher, educated at the Boston Latin School and at Harvard College; instructor in the Boston Latin School (1855–1860); entered the ministry and became Bishop of Massachusetts in 1891; author of *Oldest School in America* and of several theological works. W. S. M.

Reference: —

ALLEN, A. V. G. *Biography of Phillips Brooks.* (New York, 1901.)

BROUGHAM, HENRY, BARON BROUGHAM AND VAUX, 1778–1868. — Lord Chancellor and educational reformer; born in Edinburgh of an English North Country family; educated at Edinburgh High School and University; one of the founders of the *Edinburgh Review.* In 1805 Brougham came to London and studied law. He was an active writer in the Whig interest. He became M.P. for Camelford in 1810, and quickly won a great reputation as a Parliamentary orator. In 1816 he secured the appointment of a Parliamentary Committee on the education of the lower orders in the metropolis, the Report of which drew public attention to the educational destitution of London and prepared the way for subsequent Parliamentary action. In 1818, on the reappointment of the Committee, he extended its inquiry into the administration of educational charities, provoking bitter resentment, but paving the way for later reorganization of charitable endowments by a state department. Brougham was untiring in his advocacy of adult education for workingmen by means of mechanics' institutions. For many years he took a leading part in Parliament in pressing questions of educational reform upon the thoughts of the nation. In 1820, basing his proposals upon the results of his Committee's investigations, he introduced a bill, the object of which was to establish elementary schools wherever needed, to give the magistrates the right to establish schools the cost of which was to fall upon local rates, to secure efficient teachers, to establish religious instruction upon a nondenominational basis, and to utilize obsolete charities in aid of elementary education. The bill was opposed by Nonconformists and Roman Catholics, who thought that their interests were imperiled by it.

In 1825 Brougham published his *Observations upon the Education of the People,* which ran through 20 editions in one year. In 1833 he recanted in the House of Lords his former views in favor of compulsory education. In 1835 he addressed the House of Lords on the education of the people, and urged that the elementary schools then in existence were too few in number and that they gave a kind of instruction exceedingly scanty and imperfect. In order to relieve the educational destitution of the large towns, he urged that the State should furnish funds, but should apply its aid in such a manner as not to interfere with the exertions of individual zeal or to cut off the supplies of private munificence. He recommended that government grants should be offered on condition that they were met by an equal amount of local contributions. He strongly urged the establishment of infant schools and a reform of the treatment of juvenile offenders. He advocated state aid to normal seminaries for training teachers, and reforms in the administration of educational charities by means of the establishment of a Board of Commissioners to be appointed by Parliament. All Brougham's recommendations were subsequently adopted by the government, though after considerable delay. He was a man of nervous temperament, vain, eloquent, profoundly convinced of the need of educational reform, but distrusted by his contemporaries on the ground of defects of character and some instability of political judgment. He stands out, however, as one of the great advocates of educational improvement in England during the years 1816–1835, and on the whole his policy was sound in view of the complex conditions of English life. His early experience of Scotland had convinced him of the value of popular education; his knowledge of Continental systems made him realize how indispensable was the action of the State in any extensive development of popular education; but he appreciated the services which the clergy of the Church of England and the various religious bodies had rendered to English education and saw that it was necessary to secure their continued coöperation in any plan designed for the further development of educational work among the poor. M. E. S.

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Brougham, H. *Life and Times of Henry, Lord Brougham, written by himself.* (3 vols., 1871.)
Dictionary of National Biography.
Montmorency, J. E. G. de. *State Intervention in English Education.* (Cambridge, 1902.)

BROWN, GEORGE (1823–1891). — Educator, attended Phillips Academy at Andover, the University of Vermont, and Jefferson Medical College; organized a private school for feeble-minded children at Barre, Mass., 1851, and conducted it for 40 years; active in the movement for providing schools for feeble-minded and idiotic children, and the author of several addresses and pamphlets on the care and training of the feeble-minded. W. S. M.

BROWN, GEORGE PLINY (1836–1910). — Superintendent of schools at Richmond, Ind., from 1860 to 1871; principal of the high school at Indianapolis during the next 3 years, and superintendent of schools at Indianapolis from 1874 to 1879. During the next 7 years he was principal of the Indiana state normal school at Terre Haute. From 1887 until his death he was the editor of *School and Home Education* (formerly the *Public School Journal*). He was the author of a textbook on grammar and numerous essays on the philosophy of education. W. S. M.

BROWN, GOOLD (1791–1857). — Schoolman and textbook writer, educated in the public and private schools of Rhode Island; teacher in the Friends' schools (1810–1813); principal of a private school in New York City (1813–1833); author of a long series of grammatical textbooks, including *Institutes of English grammar*, *First Lines of English Grammar*, and *Grammar of English grammars.* W. S. M.

BROWN, JOHN (1715–1766). — Son of a clergyman in Northumberland; educated at Wigton Grammar School and St. John's, Cambridge; in 1756 became rector of Great Horkesley near Colchester. Brown published in 1757 *An Estimate of the Manners and Principles of the Times.* In 1765 he published *Thoughts on Civil Liberty, on Licentiousness and Faction.* In this work he advocated the establishment of a national system of education under the authority of the State. He argued that " For want of a prescribed code of education to which all the members of the community should legally submit, the manners and principles upon which alone the State can rest are in England ineffectually instilled, and are vague, fluctuating, and self-contradictory." In an appendix to this essay, Brown made more detailed proposals for a code of education, defining it as " a system of principles, religious, moral, and political, . . . to be instilled effectually into the infant and growing minds of the community for the great end of public happiness." These proposals indicate the existence of a body of opinion in England at that time favorable to the establishment by the State of a system of national education analogous to those set up in different parts of Germany during this period of philanthropic monarchy. In England, however, the existence of the Nonconformist interest, unflinchingly opposed to the inculcation of Anglican doctrines by means of a system of state schools, prevented the realization of Brown's hopes, and caused the social and educational development of England to be entirely different from that of the German states. Brown's pamphlet derives its great importance in the history of English education from the fact that it provoked Joseph Priestley (*q.v.*) to write and publish in the same year (1765) his *Remarks on a Proposed Code of Education*, in which he states with passion the arguments against any attempt to organize education by government. Priestley's essay is the *locus classicus* in English literature of the eighteenth century for Nonconformist arguments against national organization of education by the State acting in concert with the Established Church.

In the last years of his life Brown, in correspondence with Dr. Dumaresque, who had been consulted about the provision of a school system for Russia, submitted to him an ambitious plan for the civilization of Russia. This was laid before the Empress, Catharine II, who suggested Brown's undertaking a journey to St. Petersburg for consultation. At the last moment, in fear of the Russian climate, Brown canceled the arrangements.

Brown suffered constitutionally from severe depression of spirits, and in September, 1766, committed suicide. M. E. S.

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BROWN, MATTHEW (1776–1853). — Educator, graduate of Dickinson College; teacher in the schools of Pennsylvania (1794–1796); instructor in Washington College (1805–1815); president of Jefferson College (1822–1845). W. S. M.

BROWN, SAMUEL GILMAN (1813–1885). — Educator and author, educated in private schools and at Dartmouth College; teacher in the high school at Ellington, Conn. (1832–1834); principal of Abbot Academy at Andover (1835–1838); professor in Dartmouth College (1840–1867); president of Hamilton College (1867–1881); author of *Spirit of the Scholar.* W. S. M.

BROWN UNIVERSITY, PROVIDENCE, R.I. — An institution chartered under the name of Rhode Island College, by the General Assembly of Rhode Island in 1764, and owing its foundation to a proposal made in 1762 to the Philadelphia Baptist Association by the Rev. Morgan Edwards, pastor of the First Baptist Church in Philadelphia, looking toward the establishment of a Baptist college. Rhode Island was selected as the location because it recognized religious liberty and was Baptist in origin and attachment. The president, 8 of 12 members of the Board of Fellows, and 22 of the 36 members of the Board of Trustees, must be members of Baptist churches; 4 trustees must belong to Congregational churches, and 5 each to the Episcopal Church and to the Society of Friends. The Chancellor, Secretory, and Treasurer, however, are chosen without denominational restriction; in administration the university is strictly nonsectarian. Both governing boards are self-perpetuating. There is a sentiment among the alumni in favor of removing the denominational provisions from the charter.

The first president was the Rev. James Manning, elected Sept. 4, 1765, a graduate of Princeton (1762). In 1769 the first class of Rhode Island College was graduated at Warren; in 1770 the present University Hall, modeled after Nassau Hall, Princeton, was erected on the college grounds in Providence, chiefly by subscriptions from residents of that city. The first college funds, amounting to $4500, were collected in England and Ireland in 1767–1768. In 1804 the name was changed to Brown University, in honor of Nicholas Brown, 1786, a benefactor. The successors of president Manning, all of them Baptist clergymen, have been: Jonathan Maxcy, 1792–1802; Assa Messer, 1802–1826; Francis Wayland, 1827–1855; Barnas Sears, 1855–1867; Alexis Caswell, 1868–1872; Ezekiel G. Robinson, 1872–1889; Elisha B. Andrews, 1889–1898; and William H. P. Faunce, 1899–. President Wayland reorganized the studies on an elective basis, established a 3-year course for the baccalaureate, encouraged graduate research, and made the sciences prominent in the curriculum. During the administration of President Andrews, the number of students increased from 286 to 860, the number of graduate students rose from 3 to 101, all the old departments were reorganized and new departments added, the funds reached $1,125,685, and important additions were made to the buildings and grounds. One year after the inauguration of President Faunce, the endowment was increased by $1,000,000, a second million being added a year later. The sudden increase in the number of students coincident with the accession of the new president made both internal and external reorganization necessary. In the 10 years since 1899, the faculty has been reorganized; 6 new chairs of instruction have been created and filled, and the number of courses offered has increased from 83 to 119. The graduate department has been fully organized. The departments of Civil and Mechanical Engineering have been installed in a fully equipped engineering building. A summer experiment station for biological study has been opened at Warwick, R.I. Under an arrangement with the Rhode Island School of Design, the university sends its art students to the School of Design for instruction in drawing and painting, in return for which privilege the School of Design uses the university's machine shops. A system of visiting committees, similar to that in force at Harvard University, involves the appointment of about 150 men from business or professional life, 5 to 10 for each department, who annually inspect the courses of study, laboratories, and equipment.

Brown University maintains undergraduate courses for men, in arts, pure science, and electrical and mechanical engineering, leading to the appropriate degrees; admission is by examination and certificate from approved high school. The university is a member of the College Entrance Examination Board, of the New England Certificate Board, and of the New England Association of Colleges and Preparatory Schools (see College Entrance Boards). Graduate courses for men and women lead to the doctor's and master's degrees. In October, 1891, a women's college was founded, which at first gave only admission to university examinations and awarded certificates of proficiency; in June, 1892, all degrees and graduate courses were opened to women, and the college was designated the Women's College of Brown University. The Women's College is housed in a separate building; there are also a women's dormitory and a gymnasium. This college is separately endowed with about $85,000. A system of student self-government is maintained. All teaching in the Women's College is by members of the instructing staff of the university. Extension courses enrolling annually from 250 to 400 teachers are given in the university buildings, and give credit toward a university degree. A medical school was established in 1811, which existed until 1828 and had 87 graduates.

Student life at Brown partakes of the characteristics of both the traditional " small college " and the large university; this state of affairs is due to the rapid growth of the student body. The fraternities are an important element, and still occupy a position somewhat like that which they hold in smaller New England colleges. Their membership includes a large proportion of the students, and their life centers in chapter houses, 5 of which have been erected or leased in recent years, a development which has been criticized as tending to draw men from college dormitories and refectories. The following fraternities have chapters at Brown: Alpha Delta Phi, Delta Phi, Psi Upsilon, Beta Theta Pi, Delta Kappa Epsilon, Zeta Psi, Theta Delta Chi, Chi Psi, Delta Upsilon, Phi Delta Theta, Alpha Tau Omega, Chi Phi (local), Delta Tau Delta, Phi Kappa (organized by Roman Catholic students, local), Kappa Sigma, Phi Gamma Delta, Phi Kappa Psi, and Kappa Alpha Theta (women). In 1889 the old playground of the university, now known as Lincoln Field, was graded for athletic purposes; in 1898 a new athletic field was laid out on Camp Street, a mile and a half from the university. The Brown Union, a social club for a majority of the students, occupies a building in which are the headquarters of all the student enterprises. There is a Supervisor of Athletics; stringent eligibility rules have been established by the faculty, but all other questions concerning athletics are settled by the students themselves.

The library dates from 1767. In 1842 it contained 1000 volumes; it has now (1909) about 160,000 volumes. In June, 1908, there were enrolled 6681 graduates of the university, of whom 457 were women and 617 had received honorary degrees. In April, 1908, the funds of Brown University, exclusive of those pertaining to the John Carter Brown Library, amounted to $3,305,390. The average salary of a professor is $2680. There are (1909) 91 members on the instructing staff, of whom 29 are full professors. The students number 967, divided as follows: undergraduate men, 681; Women's College, 183; graduate students, 111. C. G.

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BRUNI, LEONARDO D'AREZZO. — A humanist of the fourteenth century, born at Arezzo, whence he was known as Aretino. He studied civil law at Forence and Ravenna. While at Florence he was attracted to the new movement by Chrysoloras (*q.v.*), and became an ardent student of Greek. He translated Plato, Aristotle, Demosthenes, and Plutarch. He also wrote *Historiarum Florentiarum, Libri XII*, and lives of Dante and Petrarch. He was Papal Secretary under four popes, and at Florence enjoyed the patronage of the Medici.

BRUNSWICK, DUCHY OF, EDUCATION IN. — See German Empire, Education in.

BRUSH WORK.— See Art in the Schools; Design.

BRUSSELS, UNIVERSITY OF. — This institution for higher learning owes its origin to the faculties established at Brussels under the control of the Imperial University (1806), although the university as such was not created till 1834. The university is independent, and is not an incorporated body. It is maintained by municipal grants and the liberal gifts of wealthy manufacturers. Among the special schools supplementing the work of the four faculties (law, science, medicine, and philosophy) are several scientific institutions with ample laboratory facilities, a higher commercial school, and the school of political and social sciences. The last named, created in 1889, soon after took possession of the Solvay Institute, the gift of the citizen whose name it bears, a unique structure admirably arranged for the researches carried on by the professors and students of the specialties to which it pertains. The activity of this free center of learning and research is indicated by the *Revue de l'Université*, the organ of the institutions, the *Union des anciens Étudiants*, which extends aid to young and needy students, and the university extension work, of which Brussels is the inspiring center. In 1907–1908 the students were distributed as follows: philosophy and letters, 128; law, 188; sciences, 224; medicine, 297; special schools, 353.

See Belgium, Education in.

BRYN MAWR COLLEGE, BRYN MAWR, PA. — A college for women situated in the suburbs of Philadelphia, founded by Dr. Joseph W. Taylor in 1880. The college was opened for instruction in the autumn of 1885. The college grounds cover 52 acres, on which are located 3 buildings, which include the library, lecture rooms and laboratories. Six dormitories are provided for the students. The students are divided into 3 classes — graduate, undergraduate, and hearers. A large number of fellowships and scholarships are offered in the graduate school. For entrance into the undergraduate department candidates must pass the matriculation examination of the college, the requirements for which are equivalent to 17.5 units. The examination of the College Entrance Examination Board (*q.v.*) is accepted as an equivalent. Courses are offered leading to the degree of B.A., but candidates must elect their courses in accordance with the Group System (*q.v.*). The hearers are admitted to the courses under certain conditions, but may not proceed to a degree. In 1909–1910 there was an enrollment of 425 students, of whom 88 were graduates. The faculty includes 10 professors, 14 associate professors, and 33 associates, readers, lecturers, and demonstrators. The president is M. Carey Thomas, Ph.D., LL.D.

BUCHANAN, GEORGE (1506–1582). — A humanist and educationist of eminence, who was placed by his contemporaries in the very front rank as a scholar and a poet. Born at Killearn in the county of Stirling, Scotland, he became at the age of 14 a student at the University of Paris, and his life from that time till its end was devoted, almost without a break, to education and letters. He responded at an early period to the new spirit that was fast spreading over Western Europe, and as a humanist attacked the barren teaching of the schoolmen and the ignorance and superstition of the Roman priesthood. His native country was unaffected by the Renaissance, and even the University of Paris, to which he returned after spending a few years (1522–1526) in Scotland, was dominated by scholasticism. Buchanan, however, introduced genuine classical studies into the College of Ste. Barbe, of which he was regent, and signalized his rupture with the Church of Rome by writing three satires on her clergy, the *Somnium*, *Palinodia*, and *Franciscanus*. He also advocated in his *De Jure Regni* the rights of subjects, and held that kings who ruled tyrannically should be dethroned. Buchanan's humanism did not take the form of mere verbal scholarship. He used the Latin tongue as a man of letters to convey to educated Europe his views on public affairs and his criticisms on human life. His real work, however, was that of an educationist. This was not so clearly recognized by his contemporaries, who were impressed chiefly by his scholarship and his poetic gifts. But it is now generally admitted that the impetus which he gave to the cause of education in Scotland has been of more value to his countrymen than his great reputation as a poet. The chief business of his life from his twentieth year to his death was the teaching of youth. He was a professor, successively, at the College of Ste. Barbe, Paris; the Collège de Guyenne, Bordeaux; again in Paris in the Collège du Cardinal Lemoine; and in the University of Coimbra in Portugal. His last scholastic appointment was the principalship of St. Leonard's College, St. Andrews, Scotland. He acted also as tutor to the son of the Earl of Cassillis, to an illegitimate son of James V of Scotland, to the son of the famous Maréchal de Brissac, and to King James VI of Scotland. This last post he nominally held till his death in 1582, for in his Testament dative he is described as "preceptour to ye Kinge's majestye the tyme of his deceis," so that he may be said to have died teaching. This indeed is literally true, for James Melville records that visiting him in his last illness, along with his uncle Andrew Melville, and Thomas Buchanan, they found him sitting in his chair "teaching his young man that servit him in his Chalmer to spell a, b, ab; e, b, eb; &c. After salutation Mr. Andro sayes, 'I sie, sir, ye are nocht ydle.' 'Better this,' quoth he, 'nor stelling shiep or sitting ydle quilk is als ill.'" Indeed, it is the spirit that underlies this act and pervades these words that has done more for education in Scotland than any special scheme of reorganization of school or university teaching with which Buchanan's name may be associated. It is true that he translated Linacre's Latin grammar and was one of the Commissioners appointed to prepare a plan for the reconstruction of St. Andrews University. He was also instrumental in securing several benefits for Glasgow University, but his enduring worth as an educationist after all lies in the inspiration which he gave to Scottish youth and in presenting to them an ideal in the world of literature and learning which it has been their aim to realize. D. McM.

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Sandys, J. E. *A History of Classical Scholarship*, Vol. II. (Cambridge, 1908.)

Wallace, R., and Smith, J. C. *George Buchanan.* (New York, 1900.)

BUCHANAN, JAMES. — The first teacher of the first infant school in Great Britain. Although a poor weaver who at first could scarcely read, write, or spell, Robert Owen (*q.v.*) selected him in 1815 to take charge of the infant school at New Lanark on account of his love of children and his readiness to be instructed. In 1818 Buchanan was appointed by a committee of the most prominent leaders of the time in England, including Lord Brougham and James Mill, to take charge of a similar school in London. But removed from the influence of Owen he failed. In 1840 he left for South Africa, where two of his children were infant teachers. It is very probable that Wilderspin (*q.v.*), who came to be regarded as the leader of this infant school movement, gained his inspiration from Buchanan.

See Infant Schools.

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BUCHAREST, UNIVERSITY OF. — See Roumania, Education in.

BUCHTEL COLLEGE, AKRON, OHIO. — A coeducational institution, founded in 1870 by the Ohio Universalist Convention, and opened in 1872. Academic, collegiate, and fine arts departments are maintained. In the college classical, scientific, and philosophic courses are offered, leading up to the appropriate degrees. The requirements for admission are 15 units. Admission is by certificate from an approved high school or academy or by examination. The college stands on a campus comprising 6 acres, on which there are 8 buildings, valued, together with the equipment, at about $130,000. There are on the faculty 10 professors and 12 instructors and assistants. There were enrolled in 1909–1910, 132 students in the college, 120 in the academy, and 57 in the fine arts department. Rev. A. B. Church, D.D., LL.D., is the president.

BUCKNELL UNIVERSITY, LEWISBURG, PA. — Incorporated as a nonsectarian institution in 1846. The administration is in the hands of a self-perpetuating board of trustees. The property of the institution exceeds one million dollars, and the productive investment amounts to over $700,000. This money is largely the gift of several hundred persons. An academy, an institute for young women, and a school of music are maintained in addition to the college. Pupils are admitted to the institute for young women at the age of 12, and receive courses extending over 5 years, at the end of which they are admitted to the sophomore year in the college. Students are admitted to the college either on certificate from approved high schools, Pennsylvania state normal schools, the College Entrance Examination Board, and New York State Board of Regents, or by examination. The requirements for admission are approximately 15 units. The college offers 8 courses, each of 4 years, leading to the appropriate degrees. The buildings of the college proper are 9 in number. The enrollment in 1909–1910 was 527. There are 21 professors, 2 assistant professors, and 11 instructors and lecturers. John Howard Harris, Ph.D., LL.D., is the president.

BUDÆUS, or BUDÉ, GUILLAUME (1467–1540). — Probably the most renowned French scholar of his time, and largely instrumental in the revival of interest in the study of the Greek language and literature in Paris. He not only wrote extensively on philology, philosophy, and jurisprudence, but was also a man of public affairs under Louis XII and Francis I. The foundation of the Collège de France was largely the result of Budæus' continued pleadings with Francis I, and it was doubtless at his suggestion that his friend Erasmus was invited to come to Paris as director of that institution. Most important works: *Annotationes in* XXIV *libros pandectorum* (1508); *De asse et partibus ejus* (1514), a treatise upon ancient coins; and the *Commentarii linguae graecae* (1519). His contribution to pedagogy was a French treatise, *De l'Institution du Prince*, written in 1516, but not printed until 1547 in order to avoid comparison with a similar work by Erasmus. Besides the Renaissance plea for humanistic learning, the work is remarkable for the emphasis attached to the importance of a study of history.

F. E. F.

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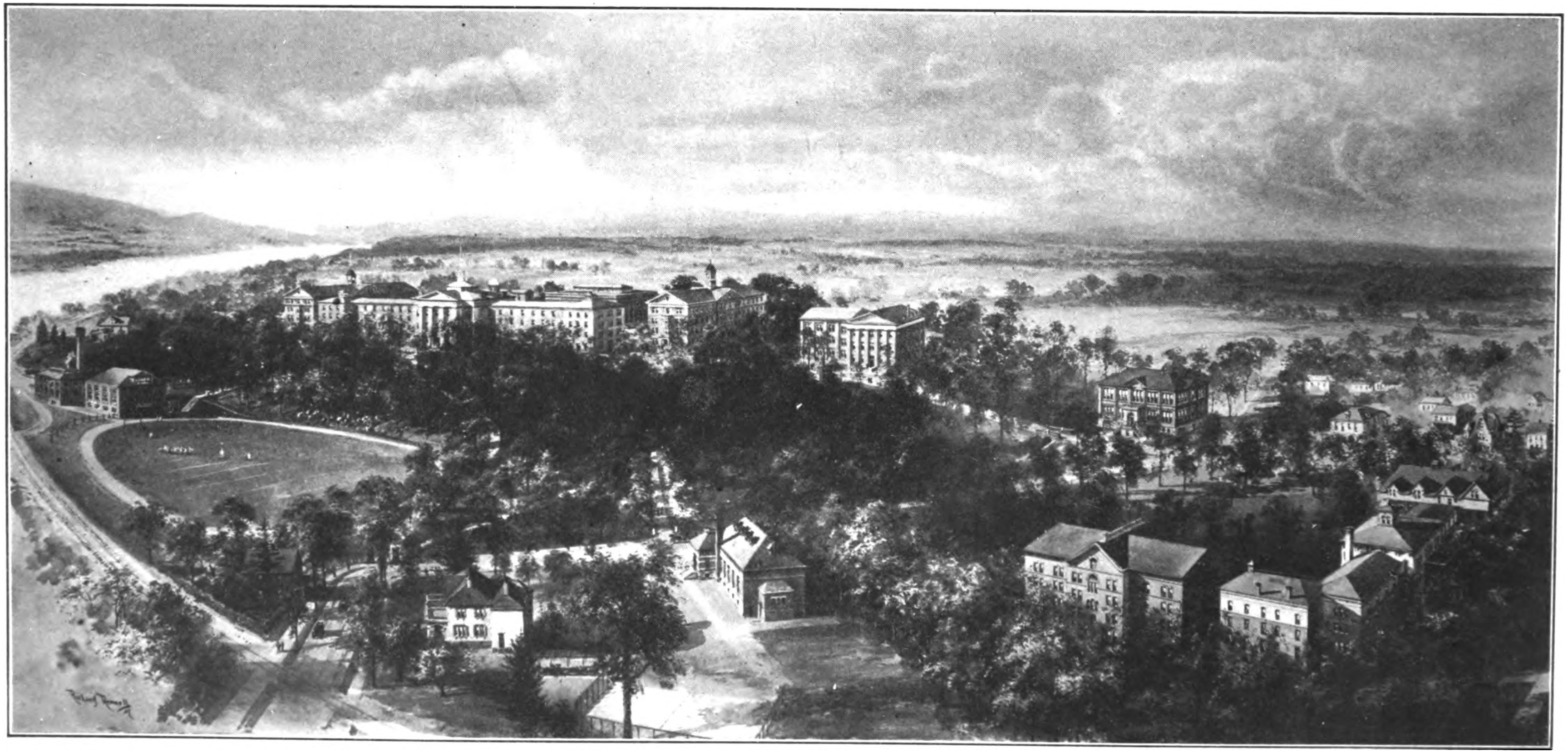
Woodward, W. H. *Studies in Education during the Age of the Renaissance.* (Cambridge, 1906.)

BUDAPEST, THE ROYAL HUNGARIAN UNIVERSITY OF. — The lineal descendant of the institution established at Ofen in 1390, which had a somewhat checkered career. It was disorganized, reëstablished at Tyrnau in 1635, moved back to Ofen in 1777, removed to Pest in 1783, and finally placed on a level with the other Austrian universities in 1850. The university includes the four traditional faculties of theology, in which instruction is given in Latin, law and political science, medicine, and philosophy. The city also boasts of a technological school, including among others departments of mechanical engineering, architecture, and chemistry. Other institutions of the city are a school of veterinary medicine, founded in 1786, the Reformed Theological Academy (1855), the Jewish Theological Seminary (1877), the Hungarian Academy of Science (1825), the Royal Hungarian Geological Institute (1869), the Hungarian National Museum (1869), etc. The library of the latter institution contains over 400,000 volumes, 16,000 manuscripts, and 500,000 documents, while the uni-



Bucknell University.

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versity library, established in 1635, contains 275,000 volumes and over 2000 manuscripts. The annual budget amounts to about $500,000, half of which sum is appropriated by the government. About 7000 students and 796 auditors were in attendance on the university during the winter semester of 1909–1910. R. T.

See AUSTRIA-HUNGARY, EDUCATION IN.

BUDDHA AND BUDDHISM. — The word "Buddha" means "the Enlightened One," and was used in ancient India as a religious title. Buddhists call a Buddha him who has solved the problem of existence, who knows and preaches the truth, and thereby becomes the teacher and the savior of mankind. Having attained the highest goal of life, Nirvana, he is no longer born again, and his death is called a final entry into Nirvana, leaving behind nothing mortal of a continued bodily existence.

According to the statements in the Buddhist Sacred Books, Buddhas appear from time to time, and their doctrine flourishes for a certain period, but when its light has been dimmed a new Buddha rises who preaches the self-same eternal truth that is briefly formulated in the Dhammapada thus: "Not to do wrong, but to do good, and to keep the heart pure. That is the religion of all Buddhas."

There is but one historical Buddha, the founder of Buddhism as it now exists in Burma, Ceylon, Siam, Tibet, China, and Japan. His name is Siddhartha Gautama of the Shakya tribe, a son of Shuddhodhana and his wife Maya. All previous Buddhas are legendary. It has been calculated that Gautama was born 622 B.C., attained to Buddhahood in 588, and died in his eightieth year, in 543 B.C. Buddhist chronology counts the years after the Buddha's Nirvana, 543 B.C.

Religious zeal has so overlaid Buddha's life with legend that Professor Wilson, of Oxford, and later on Senart, found sufficient argument for the theory that Siddhartha Gautama had never existed and that Buddha's life was originally a solar myth. This hypothesis has never been taken very seriously by scholars, and the reliability of Buddhist tradition, leaving out the obvious accretions of myths, has rather been strengthened with increasing information through the discovery of ancient monuments, relics, and inscriptions.

The Shakya constituted a small republican state of Indo-Scythians who had settled at the foot of the Nepalese Himalaya. Shuddhodhana appears to have been a wealthy and powerful nobleman, a chief or even rajah of the Gautama clan, and Siddhartha enjoyed a good education. He was married to his cousin, Yashodhara of Koli, who bore him a son whom they named Rahula, *i.e.* "fetter," because the child was likely to serve as a tie which would bind Siddhartha to the worldly interests of life.

Siddhartha was of a religious turn of mind, and (as tradition most dramatically tells), having beheld the sight of the three ills of life to which all flesh is heir, — disease, old age, and death, — he left his comfortable home and renounced the world. He first sought salvation in the ways of Brahman philosophy and asceticism. But he rejected the traditional doctrines, the authority of the Vedas and the means of salvation by prayer and sacrifice, and founded a school of his own which rapidly developed into a powerful religious movement distinguished by the rare combination of philosophical depth and a popular mode of presentation.

The canonical books of Buddhism are written in Pali, a language which bears the same relation to the older Sanskrit that Italian bears to Latin. However, during the first century of the Christian era, at a time when Buddhism began to assimilate some of the most popular traditions of the past, Sanskrit came into vogue again, and almost simultaneously a distinction was made between this new, the broader and more popular church, the Mahayana, *i.e.* the "large vessel" (viz. of salvation) and the older and more austere school, now called Hinayana (or "small vessel"). At this juncture Buddhism spread over Tibet, China, and Japan, and so it happened that in Northern Buddhism the terms and names assume the Sanskrit form, while in Southern Buddhism the original Pali prevails.

According to the dualistic notions of ancient India, all material existence was deemed evil, and the soul, called *atman*, or self, was supposed to be a being by itself. Deeply religious people therefore sought salvation through self-mortification, which should serve as a means for the liberation of the soul from the body, and for the attainment of Nirvana, the state of perfect spiritual bliss.

Nirvana is characterized as a state of perfect peace where there is no pain, no sorrow, no tormenting desires, nor wants, and this was to be attained by extinguishing or blowing out the flame of passion — hence the name for *Nirvana* (Pali, *Nibbana*) means "extinction."

Among the Western people the notion prevails that Nirvana means "annihilation," and this view was originally held also by Professor Max Müller until he investigated the question and settled it by collecting all the passages in the Buddhist books which refer to Nirvana, when he discovered to his own astonishment that there was not one passage which described this state of highest bliss, Nirvana, as annihilation. His book on the subject, entitled *Nirvana* (first edition, 1869) should have put an end to the dispute, and yet even such scholars as Oldenberg are found upholding the old view. The difficulty lies in the inability of some people to comprehend the significance of Buddhist philosophy and psychology.

Buddhists distinguish between two states:

Samsara, which is the restless and stormy ocean of life with its troubles, and Nirvana, the bliss of eternal rest. The former is pictured as a wheel, the eternal circuit of which consists of the twelve Nidanas, — a chain of twelve links. Nirvana is called the immortal, the uncreate, the refuge, the happy island, etc. Buddha taught that Nirvana can be attained in this life, and its attainment constitutes Buddhahood.

Buddha's main doctrine is the nonexistence of the *atman* (self). Since there is no separate ego-being, there is no soul-transmigration. In its place Buddha teaches the doctrine of rebirth or reincarnation based on the observation of the persistence of life forms. As the banana seed changes into a tree and finally reappears in the ripe fruit, so the character of men is preserved and transmitted. There is no entity that migrates, but the type persists. There is no *atman* (self), but there is *mana* (mind). The translation of *atman* by " soul " has given rise to the idea that Buddha teaches the nonexistence of the soul. His conception is monistic, not, like that of the Brahmans, dualistic.

Buddha's explanation of the problem of existence is dynamical. While the existence of the ego is an illusion, he teaches the persistence of action, or *Karma.* Every creature is the product of its previous Karma, and its Karma will continue according to the law of causation. Karma therefore is the root of existence, of particularity, and of individuality, and Karma is perpetuated by clinging to one's individuality. The result is suffering, but he who has attained enlightenment cuts off the thirst for existence (*tanha*). He lives in the world, but he clings no longer to his self. When the ego is recognized as a sham, egotism loses its meaning. These views are formulated in the four noble truths: (1) existence is suffering; (2) the cause of suffering is desire (*tanha*); (3) the cessation of suffering is brought about by cutting off desire (clinging to individual existence); and (4) the cessation of suffering is brought about by the eightfold noble path which consists of (1) right comprehension, (2) right resolution, (3) right speech, (4) right acts, (5) the right way of earning a livelihood, (6) right efforts, (7) right thoughts, and (8) the right state of a peaceful mind.

Truth, or religion, or the doctrine of religion, is called *Dharma*, and the congregation of the followers of Buddha, the brotherhood, is called *Sangha.* Thus the formula which is repeated three times upon joining the Buddhist faith, reads: " I take my refuge in the Buddha; I take my refuge in the Dharma; I take my refuge in the Sangha."

There is no prayer in Buddhism; but there are vows, and all Buddhists are expected to avoid the ten evils, which are three of the body, four of the tongue, and three of the mind: (1) killing, (2) stealing, (3) impurity; (4) lying, (5) slander, (6) abuse, (7) gossip; (8) greed, (9) malice, and (10) ignorance. Five trades are forbidden to monks: (1) traffic in arms, (2) the slave trade, (3) traffic in flesh, (4) the sale of liquors, and (5) the sale of poisons.

Further, there are five precepts for laymen: (1) not to destroy life, (2) not to take what is not given, (3) not to tell lies, (4) not to drink intoxicating liquors, (5) not to commit adultery. And there are three additional precepts for monks: (1) not to eat food at night, (2) not to use perfumes, (3) not to sleep in high beds but on mats.

A remarkable institution is the *Uposatha* or confession, which is however not to be made privately to a *pater confessor* (as in the Roman Catholic Church), but publicly before the assembled brotherhood.

There are indications that in the day of Buddha there were several teachers who taught more or less different ways of salvation, but Siddhartha Gautama is the one who alone is called the Buddha. He eclipsed all others, and his formulation of the doctrine proved fittest for survival. We know that Buddha's cousin and disciple Devadatta tried to form a schism by outdoing Buddha in severity, but he failed. Outside of Buddhism a certain Mahavira preached the doctrine of the Jainas and founded a religion which is still in existence, though limited to a small community of followers. While Buddha's religion indicates a strong monistic tendency, Mahavira was a dualist who claimed to have conquered materiality and all evil, and was therefore worshiped by his disciples as the Jaina or conqueror. The title Jaina was an equivalent for the name Buddha, and is still used by Buddhists as a synonym for Buddha.

While other religious teachers limited their field of activity to their immediate disciples, to monks who had retired from the world, Buddha spread the seeds of his religion broadcast, and accepted also lay disciples who did not renounce the world, but remained with their families and carried on their trades.

Buddha is called Bhagavat, the Blessed One; or Shakyamuni, the Sage of the Shakya; or the Tathagata, a term not quite clear. It is mostly translated the " Perfect One," and has been explained to signify one who has fulfilled all the requirements of being a Buddha.

Buddha was an educator of the first rank. His personality must have been possessed of an unusual impressiveness, and most of the doctrines held by Buddhists to-day were formulated by himself; nor is it improbable that he composed many of the verses of the Dhammapada. He has impressed his spirit upon a good half of mankind, and may be called a reformer on the largest scale possible. How did he succeed? (1) He lived the religion which he taught and set the example to others. (2) He endeavored to make every one of his disciples independent, claiming no authority except that of a teacher and adviser. "Be ye lamps unto yourselves," he said in his farewell address to his disciples. (3) He was clear in his statements, and practiced the method of enumerating the several points he wanted to impress on his followers. (4) He illustrated his doctrines by allegories, parables, and stories. (5) Though he rejected the Brahman doctrines (belief in the Vedas as inspired books, the Brahman ritual, sacrifice, prayer, and the caste system), he did not antagonize either Brahmanism or any other religion. Certain criticisms of Brahmanism have been attributed to Buddha, one in which the Brahmans are compared to a string of blind men (not unlike Christ's parable of blind leaders of the blind), and another ridiculing the pretensions of the god Brahma to omniscience and omnipotence, but even these are more humorous than satirical. (7) Buddha points out error and its consequences, but he does not chide, nor does he assume the authority of a Lord. In this sense even the code of moral precepts are not called the ten commandments, but "avoiding the ten evils." (8) He thrilled his hearers by pointing out the blessedness, the beauty, and the glory of his ethics. He called his religion the "glorious doctrine" (an analogy to the Christian "gospel"). (9) He presented the truths he taught in poetical form, which added the euphony of Pali verse to a convincing appeal to truth.

The many striking similarities between Buddhism and Christianity suggest historical connections, but the influence of Buddhism on Christianity must have been indirect; there was no direct borrowing. On the other hand, the influence of the Christian Nestorians on the formation of Lamaism (the hierarchic Buddhism of Tibet), is undeniable. A most curious coincidence is the accidental similarity in sound of names, such as Maria — Maya, Johannes — Ananda, Petros — Shariputra, Judas — Devadatta, etc.

The literature on Buddhism is very extensive. The ancient canonical books are collected in a library called *Tripitaka*, the "three baskets," consisting of the *Dharma* (doctrine), the *Vinaya* (precepts and rules), and the *Abhidharma* (philosophy).

The best known and most characteristic books of the Buddhist canon are the *Dhammapada*, a book of stanzas, religious poems of deep earnestness; the *Sutta Nipata*, a collection of discourses; the *Dhamma-Chakka-Pravatana Sutta*, or the *Foundation of the Kingdom of Righteousness*, and the *Mahaparinibbana Sutta*, a story of the last days of Buddha.

Further there are several biographies. The *Buddhacharita* is a life of Buddha by Ashvaghosha. Another life of Buddha, in the original Sanskrit, has been lost, but exists still in a Chinese translation under the title *Fo Sho Hing Tsan King*. The best known of the later biographies and the most fantastic story of Buddha's life is the *Lalita Vistara*. The *Jataka*, or "birthstories," contain the folklore of Buddhism. They are popular tales with a moral.

P. C.

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BUDÉ. — See Budæus.

BUDGET, SCHOOL. — National. — The lack of any national educational plan and the absence of any direct federal control of organized public education in the United States serves to reduce education to a position of very minor importance as a factor in the federal budget. Nevertheless, each of the executive departments of the national government directs and carries on enterprises of an educational or quasi-educational character, the expenditures for which are authorized and approved by Congress. Consequently, while the annual amount of such expenditures is insignificant in comparison with the total national outlay for all purposes, it does contain items of signal importance to the educational welfare of the nation. The appropriations of the Sixtieth Congress (1907) in behalf of education may be cited as typical of the existing fiscal position of education as a federal undertaking. The total assembled from the several departmental budgets amounted to more than fourteen and one half millions of dollars. This included funds for the public schools of the District of Columbia, the Smithsonian Institution, the Library of Congress, international scientific congresses, military and naval academies and training institutions, Indian education, Bureau of Education, and the continuing appropriations for colleges of agriculture and mechanic arts. Excepting the last-named item, the appropriations were in every case for the benefit of special institutions and for extraordinary purposes having little or no relation to the general system of public schools. Numerous proposals have been made in Congress for the enlargement of the sphere of federal influence through appropriations to the several states for various general educational purposes, the most significant of which have been those providing for national appropriations in aid of elementary and secondary industrial and commercial schools. Until, however, there is a more logical organization of the educational activities carried on under national auspices, the importance of education in the federal budget will be uncertain and varying. (See FEDERAL AID TO EDUCATION.)

State. — The fiscal administration of public education in the different states of the Union presents the greatest diversity. Practically speaking, elementary and secondary schools receive their major support from local taxation, supplemented by an annual apportionment from the income of permanent state funds established for schools by general state taxes, and by various special aids. (See articles on APPORTIONMENT; FUNDS; TAXATION.) Higher and professional institutions, and schools for special classes, being administered directly by state boards and officers, are dependent entirely upon the state as a supporting unit. Very frequently the state constitution renders it mandatory upon the legislature to maintain these institutions. They are, therefore, of considerable importance in general state finance.

Two general policies are to be observed with reference to the ordinary support of special state educational institutions. Under the first, a more or less stable amount of support is granted to each, through either continuing appropriations, or specified state taxes. As typical of the principal different budgetary methods whereby a fixed portion of support is attempted may be cited such instances as the special state taxes levied in California, Colorado, Indiana, Iowa, Kentucky, Michigan, Minnesota, Nebraska, Ohio, and Wisconsin, for the university, agricultural colleges, normal schools, etc.; the special state tax (one mill) in North Dakota (apportioned as follows: *thirty-three* one hundredths of a mill to the state university and school of mines, *twenty* one hundredths of a mill to the agricultural college, *fifteen* one hundredths of a mill to one state normal school and *thirteen* to another, *six* one hundredths of a mill to the state school for the deaf, *two* one hundredths of a mill to the state school of forestry, *four* one hundredths of a mill to the academy of science, *seven* one hundredths of a mill to state industrial school); and the general education fund in Tennessee, consisting of 25 per cent of the gross revenue of the state (61 per cent for general apportionment to local communities for elementary and secondary education; 10 per cent for special apportionment to local communities; 8 per cent for special aid to county high schools; 1 per cent for school libraries; 13 per cent for state normal schools; and 7 per cent for the university). These fixed funds are usually augmented through appropriations for buildings and sundry special purposes at each legislative session.

Under the second, and more widely adopted, policy, the responsibility of providing for the support of the several state educational institutions and interests is committed to each annual or biennial legislative session. In practically every instance controlling boards and officers are required to present at the close of each financial period (annual or biennial) proper reports containing among other things an account of fiscal operations. These published reports become the medium of direct communication between institutions and legislature. Theoretically they are the basis for the legislative determination regarding support for the next fiscal period. Practically, however, the needs and claims of the institutions are presented by their officers directly, or indirectly through special committees of the legislature, to the legislative budget committee (committee on finance, committee on claims), which is under the necessity of adjusting the total of appropriations to the estimated revenues. While this second policy is the more flexible, and enables the readier adaptation of financial means to educational needs, it undoubtedly leads to competition among institutions for financial preferment, and frequently permits the sacrifice of education in the interests of party expediency. The contemporary trend is toward the first policy in order to insure to institutions a support consistent with normal development and to remove the details of this feature of public finance from the uncertain action of political forces.

Whichever of the foregoing policies as to ordinary financial support of special and higher institutions is followed, two methods are employed for the general legislative control of expenditures. By the one, the limit of expenditure for each purpose — salaries, repairs, library, etc. — is specifically indicated; by the other, no detailed prescriptions are imposed, the distribution and expenditure of the appropriations being left to the discretion of the controlling boards.

Originally the financial policy of the states toward higher and special schools was one of decentralization; that is, each was treated independently of the other. The marked tendency of the last decade has been to bring public expenditures for these purposes more and more within the control of special administrative boards, thus preventing to a large degree unnecessary institutional competition and duplication of effort, and establishing a basis for the best development in so far as this is dependent upon support. The well-defined movement for the more thorough auditing of the finances of all public institutions has also introduced a factor calculated to produce more economical financial administration.

From a fiscal point of view, the relation of the state to local systems of elementary and secondary schools is of much larger significance than that involved in the mere mechanical distribution of state school funds. The apportionment of general state taxes for education and the distribution of the income from permanent school funds are made in accordance with some general plan that assumes to diminish to some extent the differences in educational facilities existing between local communities, especially differences primarily due to the insufficiency of the local sources of support. The establishment of the various forms of special aids aims, in addition, to stimulate localities to larger effort in behalf of education. In consequence, the state plays a not unimportant part in the making of the local educational budgets; chiefly through the attachment of conditions to the funds distributed and apportioned. The requirement that local communities shall raise by taxation for the support of their common schools a sum proportional to that received from the state is quite uniformly found in constitutions or statutory enactments. The acceptance of special aids commonly imposes proportional financial obligations upon the community. As further channels of indirect state influence upon local finances may be mentioned the prescriptions of maximum or minimum tax levies for schools, the segregation of certain proportions of funds for special purposes (California, 60 per cent of county school money exclusively for the payment of teachers' salaries in elementary schools), and minimum salary laws.

Local. — In those states in which the district is the unit for local educational administration, the details of fiscal policy are largely prescribed to the local board of control by the electors at the annual meeting, at which the amount of the local tax is determined and levied, expenditures authorized, and accounts audited for the preceding fiscal period. All of the financial powers and duties of the district meeting are exercised and performed within the general provisions of the state code. If the district meeting should fail to comply with the state prescriptions concerning school support and funds, authority for such compliance is usually delegated to the district school officers. The question of the issuance of bonds or certificates of indebtedness must be submitted to the electors of the district for decision. Under the township and county system of school control the financial affairs are under the immediate supervision of the town or county school officers.

The expansion of the accepted duties and functions of government in recent years has multiplied many fold the expenditures for public purposes. This increase has been most noticeable in the budgets of urban communities. Of the items responsible for the increase that for public education has been conspicuous. Traditionally the democratic conception of education has impelled local governments to provide, if not generously, at least first, for the support of the public school. The double position occupied by the public school System of the city (*a*) as the instrument of the state in carrying out the state policy, (*b*) as the means for the satisfaction of local needs and the realization of community ideals, complicates in many ways such questions as those involved in the budget and the conduct of financial operations. To the extent that it shares in the apportionment of state school funds and the allotment of special aids to education, the city falls within the scope of the general control of the state. These apportionments and aids constitute but a relatively small part of the necessary resources for the public schools. The supporting funds, to a much larger extent than in the case of non-urban areas, are derived from voluntary local property taxation and various forms of special taxes and licenses. On this account, the agencies and methods for the control of revenues and expenditures are of immense importance. Fiscally, American cities may be divided into two principal classes: those in which the local board of school control possesses (within the limitations imposed by the State through charter or general statute) authority over the raising and expending of funds necessary to carry on the public schools and other activities under its control, independent of the general municipal government; and those in which the board of school control is treated as a department of the municipal government and consequently must submit its annual financial estimates for approval and revision to that authority of the municipal government (board of estimate and apportionment, or council) which ultimately determines the budget. Evidence based upon the experience of cities in different sections of the country leads to the conclusion that each of these financial methods has its advantages. By reason of the distinctive character of education as a municipal function, and in order to safeguard the public schools from those partisan influences that have in the past characterized municipal government in the United States, the quite uniform judgment of those competent to pass upon the situation is that municipal boards of education should have the power to make tax levies, within the limits set by the State, without being subject to review or supervision by other municipal authority. (See CITY BOARDS OF EDUCATION; CITY SCHOOL ADMINISTRATION.)

The magnitude of the public expenditures for the various social undertakings of the modern city is causing not only a careful scrutiny of the various factors that make up the total annual outlay for the system of public schools, but also a scientific comparison of this outlay with those for other public purposes. Obviously, cities will present wide differences with respect to the educational budget. Diversity in the various state systems of education, as well as difference in size and in environmental conditions render difficult the standardization of urban expenditures. On the other hand, public welfare requires the application of those principles of financial procedure that contribute most directly to the efficiency as well as the economical administration of municipal enterprises. This presupposes a scientific analysis of the public budget; such an analysis as has not yet been made. American cities do not know within an even reasonable certainty the real cost of their public schools. No reliable measurements have yet been made to determine the actual cost of elementary education, secondary education, and the several forms of special education. The numerous published statistics of per capita cost of public education are valueless as a basis for administrative procedure. In so far as the facts are known, and considering all cities in the United States having a population of 30,000 and above, from 6 to 46 per cent of the total amount annually expended for the maintenance and operation of all municipal activities is devoted to public schools. The central tendency is that 25 per cent of the total annual budget goes for education. That this wide variability is due in some degree to the present inadequate systems of public accounting there can be no doubt. In the main, however, it may be attributed to the influences of differing municipal ideals of the importance of the educational function. Further and more detailed investigations are needed as a basis for determining the proper budgetary position of public education.

Trustworthy conclusions, concerning the economic effectiveness of urban expenditures for education are made impossible, owing to the wide differences among cities in the methods of accounting and reporting resources and expenditures. These differences preclude ready comparison and the establishment of normal units of expenditures. Efforts have been made to bring about greater uniformity in the financial reports of city school systems. The principal recent movements in this direction were the report of the Committee on Uniform Financial Reports of the National Educational Association in 1899, and the reports of the United States Commissioner of Education since 1907. The studies by Strayer (see bibliography) on the school budgets of cities indicate not only the method of analysis, but the need of continued investigation. E. C. E.

See City School Administration; City Boards of Education; Cost of Education and the various articles on National School Systems.

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BUENA VISTA COLLEGE, STORM LAKE, IA. — Opened in 1891 under the auspices of the Synod of Iowa as a coeducational institution. Academic, normal, and business departments are maintained. Admission is by certificate from an accredited high school or examination requiring about 12 units of work. Degrees are conferred. There are 13 professors and 4 assistants.

BUENOS AIRES, UNIVERSITY OF. — See Argentine Republic, Education in the.

BUFFALO, CITY OF. — The second largest city in the state of New York, and the chief commercial city of western New York. Incorporated as a city in 1832. In 1900 the city had a population of 352,387, and its estimated population in 1909 was 396,535. Of the total population of 1900, 30 per cent were foreign born, and but one half of 1 per cent were of the colored race. Of the foreign born in 1900, 36 per cent were Germans, 23 per cent English and English Canadians; 19 per cent Poles; 11 per cent Irish; and 6 per cent Italians. The school census, 4 to 18 years of age, was 90,515 in 1909, and the total school enrollment was 62,217 in day schools, and 7874 in evening schools. In addition, 23,510 were enrolled in private schools.

History. — The first schoolhouse was built in Buffalo in 1806. The first school tax was levied in 1818, to rebuild the schoolhouse, which had been burned in the fire of 1813. At the time of the incorporation of the city in 1832, there were 6 school districts, each with one small schoolhouse and one teacher. In 1836–1837 a law was passed authorizing the appointment by the City Council of a Superintendent of Schools for the city, to act under the direction of the Council. As there were but 7 school districts, with one teacher each, at the beginning of 1836, the duties of this superintendent must have been but nominal.

The free school system of Buffalo practically originated in 1838, in a general movement of prominent citizens to consider the educational welfare of the city. At that time, the district and private schools together failed to reach one half the children of the city. Public meetings were held, much interest was awakened, and a committee of 5 was appointed "to inquire into the condition of the schools, both public and private; to ascertain the number of children who attend school, and the expenses attending their education; and to report the same, together with some plan for the improvement of our schools." The report, when presented, was discussed at length, adopted, and sent to the Council. It recommended that the Council "take the necessary steps to cause the city charter to be so amended . . . as to enable them to carry into full effect the recommendations of the report of the committee," . . . viz.: "an entire free school system, under the authority and government of the Common Council." The report also recommended the establishment of a central high school, as soon as the resources of the city would permit. On Feb. 14, 1839, the city charter was amended by the legislature so as to contain substantially what the citizens' report had recommended, and the free school system of Buffalo had its beginning. The school districts were subdivided so as to increase the number to 15; schools were ordered established in each district; and tuition was ordered to be free to all.

In 1843 primary and higher departments were provided for, and in 1846 a "Third Department" was organized, which, in 1853, became the "Central School." In 1853–1854 the city charter was revised. The control of the schools of the city by the City Council was continued. Colored children were to be admitted to any school, but one colored school must be maintained. The cost of sites and schoolhouses was to be paid by each school district, but the expense for maintenance was to be paid by general taxation. The city Superintendent was to be elected by the people of the city, on the general city ticket, and for a 2-year term, instead of being appointed by the City Council.

In 1873 the city Superintendent endeavored to secure the passage of a law providing for a city Board of Education, who should manage the schools, but the plan elicited little popular favor, and the bill failed to pass. In 1891 a revised charter was granted by the legislature, which, in addition to reauthorizing the previous form of government of the schools, provided for the appointment of a Board of Examiners to examine teachers and to inspect the schools. In 1895 an amendment increased the term of the Superintendent of Education to 4 years. A committee is now (1909) at work on a complete revision of the charter, and may change the form of educational organization for the city.

For many years no marked progress was made in the schools, the city suffering largely from the lack of leadership in educational matters. Since 1893, however, when the present Superintendent was first elected to office, much has been done toward bringing the schools of the city up to a modern standard. New modern buildings have been erected, and the use of rented rooms decreased. Two new high schools have been opened, and have been filled to overflowing almost from the first. Since 1893 manual training, sewing, and domestic science have been introduced; kindergartens established; and the grammar school course reduced from 10 years to 9, and the ninth year made virtually a high school year. Educational standards for admission to the examinations for teachers' certificates have been set up; teachers' meetings have been introduced; and a training class for future teachers established. Supervisors have been employed to assist the Superintendent in the introduction of the special branches; antiquated textbooks have been discarded; a new course of study has been adopted; free textbooks and supplies have been provided; promotions have been made more flexible; and a truant school has been established.

Present School System. — There is no Board of Education in Buffalo, the nearest approach to it being the Committee on Schools of the Board of Aldermen. The functions of this committee are to consider and report on ordinances relating to the public education in the city. All matters relating to education not determined by the general law of the state are fixed by the city charter or by ordinances of the Council. Such matters as changes in textbooks have to be approved by the Council, and it is also within their power to determine the Course of Study. All executive functions are given to the Superintendent of Public Instruction for the city, who is elected by the people for 4-year terms. He recommends the Course of Study, changes in textbooks, salary schedules, and other legislation; selects new teachers and appoints them for the period and at the salary determined by the Council; may dismiss teachers by preferring charges, and after a hearing before and with the approval of the Mayor; and prescribes the subjects and the nature of the examinations for teachers' certificates. He appoints the Secretary of the department, who must be educated in the German language, and who also acts as supervisor of the teaching of German in the schools. The Superintendent is further assisted by a Supervisor of Primary Grades, and a Supervisor of Grammar Grades.

The Mayor appoints a city Board of Examiners of 5, 1 being appointed each year and for a 5-year term. They conduct all examinations for the position of teacher in the schools, which are in the nature of Civil Service tests. Certain educational prerequisites have recently been laid down for admission to these tests, and four grades of city certificates provided. Those who pass are arranged in order on eligible lists by the Board of Examiners, and the Superintendent can appoint teachers only from these lists. This board and its work stands as a check on political pressure. The Board of Examiners acts also as a Board of Visitors, being required to visit each school in the city at least once each year, and to report on its educational, hygienic, and material condition.

The school system consists of 1 city normal training class, 3 high schools, elementary schools, and kindergartens. In 1908–1909 the city employed 79 supervisory officers, 1399 teachers in day schools, and 92 teachers in evening elementary and high schools. A term of 192 days was provided in day schools and 62 evenings in evening schools; 27 kindergarten teachers were employed. The total expense for day schools was $1,537,414. E. P. C.

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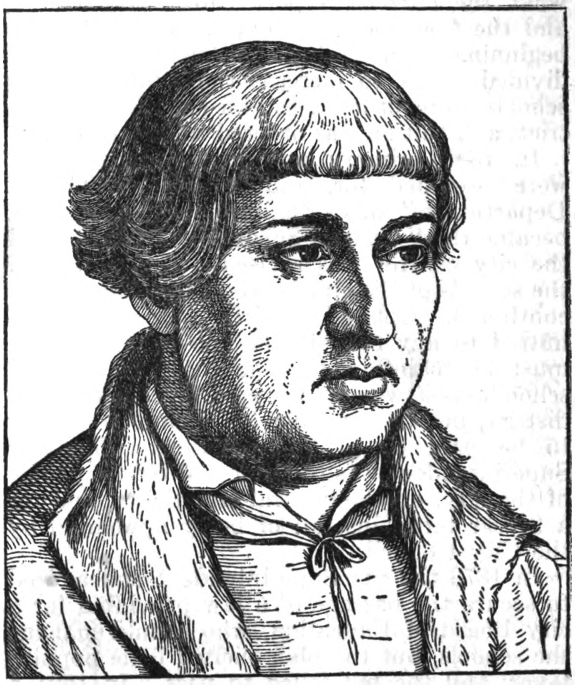
BUFFALO, UNIVERSITY OF, MEDICAL DEPARTMENT, BUFFALO, N.Y. — Opened in 1846. A 4-year medical course is given. Candidates are admitted under the regulations contained in the laws of New York, 1893, and as amended to June 1, 1906, providing for the preliminary education of medical students. There is a faculty of 38 professors and 69 instructors.

BUFORD COLLEGE, NASHVILLE, TENN. — A proprietary institution for the higher culture of young women. Collegiate and fine arts departments and schools of journalism and library training are maintained. There are no definite requirements for admission. Degrees are conferred.

BUGENHAGEN, JOHANNES (1485–1558). — A German reformer and friend of Luther and Melanchthon, called also Dr. Pomeranus. He was born in Wollin, and educated at the University of Greifswald. He entered the priesthood and became at the age of 20 rector of the town school in Treptow, where his excellent humanistic teaching widely attracted attention. He became deeply interested in biblical study and delivered lectures on the various books of the Bible and on the Church Fathers, which were attended by the townspeople and the clergy. Inspired with the zeal of the Reformation through the writings of Luther, he went, in 1521, to Wittenberg, where he soon was appointed professor in the university, as well as pastor of the city church. One of his first actions in this capacity was the restoration of the town school, which had fallen into decay. Bugenhagen's most important activity, however, began when he was called to the north of Germany to establish the Reformation and to regulate the affairs of churches and schools. In 1528 he drew up a church and school constitution for the city of Brunswick, in 1529 for Hamburg, in 1530 for Lübeck, in 1534 for his native Pomerania; and these church constitutions became the models of many others. In 1537 he was called by King Christian III to Denmark, where he was received with great honors and remained until 1539, being occupied with the reorganization of the University of Copenhagen and of the Danish church. The last years of his life were embittered by political and theological strife; he became partially blind, and died at Wittenberg, where he is buried in the city church. Bugenhagen must be considered as one of the foremost men of the German Reformation. His importance for the religious and educational development of the north of Germany is equal to that of Melanchthon for the south. But while Melanchthon's interest was chiefly directed toward the higher schools, Bugenhagen's work was especially fruitful in the field of popular elementary education, both for boys and girls. He was the first, not only to insist upon, but actually to introduce, elementary schools in cities and villages in which all children should receive instruction in catechism and in the reading and writing of the mother tongue. Thus he may be called the father of the Protestant *Volksschule*, especially of the rural elementary school. His interest in female education is especially remarkable. He considered the training of mothers the most effective means for the moral elevation of the people. He did, however, a great deal also for higher education, and even planned a system of adult education in the so-called *Lektorien*, a kind of people's universities. In all his work Bugenhagen showed great tact, a genius for


Johannes Bugenhagen.

organizing, and practical insight into the real needs of the people. F. M.

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BUILDING MATERIALS FOR SCHOOLHOUSES. — See ARCHITECTURE, SCHOOL.

BUILDINGS, SCHOOL. — See ARCHITECTURE, SCHOOL.

BULGARIA, EDUCATION IN. — Bulgaria, constitutional monarchy: area including Eastern Rumelia, 38,080 square miles; population, 4,035,623; capital Sofia, population 82,621; divisions for local administration, districts, 12 in number.

Historical. — In 1878 when Bulgaria entered upon its career as an autonomous principality under the suzerainty of the Sultan, the functions of government and nearly all other activities of a modern state were yet to be organized. Education formed an exception, for although the Turk had exploited the country, the work of instruction as carried on by Christian churches was not interfered with. The influence of the Greek Church, which comprises about 80 per cent of the population, was overpowering, and its ecclesiastics had long controlled local institutions of every kind in Bulgaria. Thus a system of clerical schools existed which was national in extent. But within the Church were two antagonistic elements: on the one side, the Greeks, numbering less than 70,000 people; on the other, the Bulgarians, a peasant people forming the great majority of the population. The small, compact body of Greeks, superficial but brilliant and proud of their historic culture, monopolized the higher offices of the Church and controlled the schools. They regarded the sturdy natives as barbarians, and eliminated their language from the school programs; thus pupils were taught the Greek exclusively, and through the insidious influence became converts to Hellenism.

The efforts on the part of the Bulgarians to free themselves from Turkish rule awakened also the desire for national expression through social institutions, and the movement for liberty was marked from the beginning by efforts to free education from the moral influence of the Greeks. To the few Bulgarian schools that had escaped destruction others were added, in which at first only the merest elements of the native language and history were taught. In 1835 two wealthy Bulgarian merchants founded, at Gabrovo, a small city in the Balkans, a secondary school of the modern European type, and furnished with modern appliances, globes, maps, etc. This school became the center from which similar schools that came later into existence drew their teachers. These Bulgarian schools, primary and secondary, depended wholly upon private resources, and had not really the sanction of law for their existence. Each school had to secure a special license from the authorities, and although the applications were seldom refused, the institutions were under constant surveillance and were closed on the slightest pretext. It was in these schools, maintained at great sacrifices and in the face of bitter opposition, that the national spirit was formed which supported the patriot leaders in their final struggle for freedom.

The constitution of 1878 recognized primary education as an essential factor in the State, and declared it to be obligatory and gratuitous. A ministry of public instruction was created; but no provision was made for the support of the schools. A law of 1881, the first dealing with primary instruction, left the matter entirely to the individual communes, which retained as a lasting effect of Turkish rule an inherent passion for autonomy. Only in the case of very poor communes was the State authorized to aid in the support of schools.

Under the leadership of Ferdinand I, who was ambitious to create a solid and permanent nation, the policy with respect to primary education was completely changed. In the first year of his reign, 1887, the state expenditure for this interest was doubled, and the next year it was still further increased. In 1891 the organic law of public instruction was passed which gave the supreme control in this matter to the State.

Present System. — The direction of all public enterprises having for their purpose the moral and intellectual development of the people was confided to the minister of public instruction, and an administrative system was created after the model of the French system, though less elaborate. Two departments were formed in the ministry, the one pertaining to primary, the other to secondary, education, and each under its own chief or director. The minister is assisted by a corps of general inspectors who are his personal representatives in their circuits; in each district there are subordinate inspectors. The official authorities are completed by district councils, which exercise advisory and judicial functions in regard to education, and by local school committees. These committees are formed by election, and women may be included in the number, provided they have taken the course of secondary instruction. The committees have direct charge of the schools, select the sites and arrange for the buildings and equipments, and nominate the teachers, who must, however, be approved by the minister.

The State supplies two thirds the amount required for the support of the schools; the communes furnish the balance. The school programs and the qualifications for admission to the teaching service are regulated by official orders. Thus, without destroying the cherished local autonomy, the State enters as a regulating and supporting factor into the work of national education. Not only has the spirit of local independence been safeguarded in the organization of the schools, but the present interests and capacities of the people are carefully considered in the arrangement of the school programs. Besides the native language and literature, the primary school course includes religion, the history and geography of Bulgaria, elements of natural science, and industrial training. The industrial training is of the most practical character; the girls are taught to sew and to cut and make garments; the boys learn the use of ordinary tools. As agriculture is the chief industry of the people, a special law provides for the support of school gardens, of which more than 500 were maintained the present year, all cultivated by school children.

The course of study for the primary schools is restricted, as the period of compulsory school attendance is very brief, comprising only 4 years, the age limits being 8 to 12. The annual school term is 10 months in the cities, reduced to 6 months in the country. The minister has therefore authorized the establishment of complementary courses of 3 years, and in many places these are already organized. Continuation classes are also maintained in cities and villages. These are conducted in the evening and on Sunday, and offer to young people and adults a chance to review elementary subjects and even to extend their knowledge.

The greatest obstacles in the way of the practical development of this system of primary instruction, which has been carefully planned to meet the present condition of the people, are: (1) the lack of schoolhouses; (2) the difficulty of obtaining competent teachers.

Many villages have no schoolhouses, and recourse is had to old mosques and barns; often even this poor accommodation is wanting. The government has therefore authorized communes to contract for loans to meet the expense of providing the necessary school buildings.

As regards teachers, it can be readily understood that those who were employed in the Bulgarian schools maintained by private effort before 1878, had been taken without regard to any special preparation for the work. In its early endeavor to create a system of primary instruction, the government left all arrangements in respect to teachers to the individual communes (cities and villages). But as a rule these were not fitted to meet this responsibility. By the law of 1891 the State took upon itself the payment of three fourths of the annual salary of teachers, and subsequently assumed the entire charge of this particular. As a consequence, the salaries are paid promptly, and have also been considerably augmented. In 1887 the average annual salary was only $120, at present it ranges from $264 to $384.

While it has not been possible to maintain definite standards of qualification for primary teachers, this purpose is kept steadily in view. Normal schools have been established, 5 for boys and 4 for girls, having a 4 years' course of study. The number of normal students is rapidly increasing; but the graduates do not yet suffice for the needs of the service, and the one test that can be universally applied to candidates for employment is that of a very simple examination; the great improvement that has taken place is indicated by the fact that whereas, in 1878, of the whole body of teachers employed, 93 per cent had only received a primary education; in the present year (1910) only 12 per cent represent this low stage of attainment. Moreover, the teachers show great enthusiasm in their work, they carry on evening classes for illiterate adults; organize popular lectures; interest themselves in local industries, and are especially active in promoting improved agricultural processes.

Where complementary, or higher, primary schools are established, they have developed a tendency toward technical training, and thus form a basis for higher trade and industrial schools; among schools of this special class may be noted a commercial school at Sofia; there are also reported high-grade agricultural schools, and 4 industrial schools in which theoretic instruction is combined with vocational training.

Statistics. — According to the official statistics, there were 4581 primary schools in 1907, with 8771 teachers and 400,308 pupils; of these 251,937 were boys; 148,371 girls. The number of children of the compulsory school age was 436,000, and of these 328,000, or 75 per cent, were enrolled in the schools; in 1903 the corresponding proportion was only 51 per cent. A bill is now pending which provides for the stricter enforcement of the compulsory school law. This is a matter, however, depending largely upon the supply of school buildings, and hence the communes are urged and assisted by the government to provide this fundamental condition.

Secondary Education. — In the endeavor to create a system of public education as the source of national strength and perpetuity, the first efforts of the government were directed to the primary school, which alone affects the entire population. But the importance of the higher orders of education, and especially the need for infusing into them the national spirit, have not been ignored. In 20 years the state expenditure for secondary education has increased threefold. There were 3 state gymnasia in 1878; at present there are 11. Meanwhile there has been marked increase in the number of incomplete gymnasia maintained by the communes with the aid of the State.

Instead of the full 7 years' course, the schools of this inferior order have 2, 3 or more classes. The entire registration in secondary schools has tripled during the last 20 years.

Of still greater importance than the increase in numbers is the improvement in the teaching service: whereas in 1888 only 27 per cent of the professors in the secondary schools had received a university education, at present the proportion is above 50 per cent. As a rule these men have studied in German universities; consequently they have introduced German methods and standards in the secondary schools of their own country. At the same time the spirit of the Bulgarian people, which is eminently practical, has determined the general trend of secondary education. The German realschule has been taken as the model rather than the German gymnasium. Thus the classics have little place in the secondary programs; in fact, they are taught only in 5 out of the 11 gymnasia, and, even in this number, to a limited extent. In their present stage of development Bulgarians have more need of practical chemists and engineers than of highly accomplished scholars. The modern spirit of the new secondary education is emphasized by contrast with that of the older Greek schools which still maintain the humanistic studies.

The bill for the further development of the system of public instruction, which was introduced into the legislature in 1909, provides for a complete revision of the scheme of secondary education. Under the proposed plan three types of secondary schools would be recognized: schools offering Latin and Greek; Latin only; and neither Latin nor Greek. The scheme in detail indicates the purpose of the government to maintain classical studies and high scholastic standards in the state schools.

One of the most important measures of the present government has been the creation of secondary education for young women. This work is still in an experimental stage; the programs are rather feeble copies of those intended primarily for the schools for young men, and the instruction is committed to men professors, pending the preparation of women for this service. But the work has begun, and the subject of its improvement and proper adaptation engages earnest consideration.

The official statistics for 1907 give the following particulars under the general head of secondary education without distinction between public and private institutions: —

SCHOOLS	NUMBER	TEACHERS			PUPILS		
		Men	Women	Total	Boys	Girls	Total
Gymnasia	20	518	129	647	6393	5925	12318
Lower middle schools	199	793	136	929	15087	6685	21772
Special and Technical	85	99	87	186	3532	2825	6357
Other schools	86	165	63	228	2567	1176	3743

Higher Education. — The University of Sofia comprises a faculty of history and philosophy, organized in 1888; faculty of mathematics and physical science, organized in 1889; and faculty of law, organized in 1902. In 1908 the university was attended by 1589 students, of whom 248 were hearers only. A few women are registered annually.

There is no provision as yet for medical studies, and theology is left to denominational seminaries.

The expenditure by the State for public instruction amounted in 1908 to 11,878,947 *leva*, equivalent to $2,292,637 United States currency. A. T. S.

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BULKLEY, JOHN W. (1802–1888). — Schoolman, educated in the common schools of Connecticut and at Hamilton College; teacher and principal of schools at Troy (1832–1838); principal of schools at Albany (1838–1851); principal of the Williamsburgh schools (1851–1855); superintendent of schools at Brooklyn (1855–1873); assistant superintendent at Brooklyn (1873–1885); active in the early educational associations in the United States. W. S. M.

BULLETINS, SCHOOL. — Official publications appearing periodically, sometimes called "teachers' bulletins." Bulletins are usually issued by normal schools and city school systems. They are designed to diffuse intelligence as to the methods and materials to be utilized in teaching according to the courses of study laid down in the particular locality. They represent one of the means for the supervision and improvement of teaching. See SUPERVISION OF TEACHERS. H. S.

BULLOKAR, WILLIAM. — A phonetist who served in the army in Queen Mary I's reign, studied agriculture and law, and engaged in teaching. He then became convinced of the necessity of phonetics as a basis for teaching English, and in 1580 published his book with the astoundingly long title: Bullokar's *Booke at large, for the Amendment of Orthographie for English Speech; wherein a most perfect supplie is made, for the wantes and double sounde of letters in the olde Orthographie, with Examples for the same, with the easie conference and use of both Orthographies to save expences in Bookes* *for a time, untill this amendment grow to a generall use, for the easie, speedie, and perfect reading and writing of English, (the speech not changed, as some untruly and maliciously or at least ignorantlie blowe abroade) by the which amendment the said Authour hath also framed a ruled Grammar, to be imprinted hereafter, for the same speech, to no small commoditie of the English Nation, not only to come to easie, speedie and perfect use of our owne Language, but also to their easie, speedie and readie entrance into the secretes of other Languages, and easie and speedie pathway to all Straungers, to use our Language, heretofore very hard unto them, to no small profite and credite to this our Nation and stay thereunto in the weightiest causes. There is also imprinted with this Orthographie a short Pamphlet for all learners and a Primer agreeing to the same, and as learners shall go forward therein, other necessarie Bookes shall speedily be provided with the same Orthographie. Hereunto are also joyned written copies with the same Orthographie.*

> *Give God the praise, that teacheth alwaies.*
> *When truth trieth, errour flieth.*

Seene and allowed according to order. (Imprinted at London by Henrie Denham, 1580 (4to, 59 pp.).

This treatise is of unusual importance not only for its advocacy of phonetics and a perfect Alphabet, but also for Bullokar's experience with regard to the teaching of his own children, making the book a pioneer work in language study and also in the method of child study. William Bullokar also published: *Æsop's Fables in tru Ortography with Grammar notz* (translated into English from a Latin Text), 1595.

John Bullokar, possibly a son of above, a doctor of physics of Chichester, published an English dictionary, entitled, *An English Expositor; teaching the interpretation of the hardest words used in our Language*, 1616. F. W.

See PHONETICS; SPELLING.

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BÜLOW-WENDHAUSEN, BERTHA VON. — See MARENTHOLTZ-BÜLOW-WENDHAUSEN, BERTHA VON.

BULWER, JOHN. — A physician in the time of Charles I, who styled himself Christopher. He wrote his *Chirologia* in 1644. This he explains as " the natural language of the hand, composed of the speaking motions and discoursing gestures thereof." In the same volume, he adds *Chironomia*, or " the art of manual rhetoricke, consisting of the natural expressions digested by art in the hand, as the chiefest instrument of eloquence." In 1648 Bulwer published his *Philocophus, or the Deaf and Dumb Man's Friend.* In this important treatise Bulwer proves that a man born deaf and dumb may be taught to "hear the sound of words with his eye, and thence learn to speak with his tongue." Bulwer says he had made the subject his " darling study." He discourses of " ocular audition," and suggests " the model of a New Academy for those originally deaf and dumb, with an edifice and gymnasium, and all kinds of materials requisite." Bulwer plaintively remarks that when he mentioned the idea to some " rational men," they only regarded it as so "paradoxical, prodigious, and hyperbolical," that they professed they must renounce their reason " before they could have faith to assist such an undertaking." Bulwer claims that he was the first to make the subject a close study. He was not, however, the first to draw attention to the possibility of training the deaf and dumb. It had been suggested in the *De Inventione Dialectica* of Rudolph Agricola (*q.v.*) (died 1485), by Juan Luis Vives (*q.v.*) in his *De Anima* (1539), and in 1590 Franciscus Vallesius in his *Philosophia Sacra* mentions that his friend Petrus Pontius, a Benedictine monk in Spain, had taught the deaf to speak. J. P. Bonnet in 1620, printed at Madrid in Spanish an account of the method of Pontius, and Sir Kenelm Digby, an Englishman, gave an account of what he had seen of Pontius' method in Spain, when he returned from that country after accompanying the Prince Charles in 1620.

See DEAF, EDUCATION OF. F. W.

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SIR WILLIAM HAMILTON. Essay on the History of the Institutions of the Deaf and Dumb, in his *Discussions on Philosophy and Education*, 1853.

BUREAU OF EDUCATION, UNITED STATES. — See COMMISSIONER OF EDUCATION, UNITED STATES.

BÜRGERSCHULE. — A term which was used at an early period in Germany to denote schools maintained by municipalities. (See MIDDLE AGES, EDUCATION IN.) The significance of the term changed somewhat in the last century, and was applied to a type of school " which aims to educate those classes of citizens who without being scholars should still be cultured." (Mager, K., 1810–1858.) Under the term *höhere Bürgerschule* such schools afforded a higher Latinless education. When the different types of higher Latinless schools were differentiated, the need for another class of schools in which the education of children up to 15 could be carried on was felt, and led to the establishment in Prussia and Austria of what came to be known under the special term of *Bürgerschule* or *Mittelschule* (*q.v.*). These schools treat the subjects of the elementary schools more completely and broadly, in some cases adding French. They are usually maintained by municipalities and tuition fees, and receive no state aid. Nor are there specific state-regulated curricula, so that local adaptation is possible. The teachers, however, must have passed special state examinations.

The *Bürgerschule* is thus a school which stands out independently from the rest of the state system. Frequently the lower grades in a complete middle school of this type are preparatory to the higher schools, particularly when these are overcrowded.

See GERMANY, EDUCATIONAL SYSTEM OF; MITTELSCHULE.

BURGH SCHOOLS. — See SCOTLAND, EDUCATION IN.

BURKE, EDMUND (1729–1797). — Statesman and writer on political philosophy; son of a Dublin attorney; his father being a Protestant, his mother a Roman Catholic, a circumstance which led him to sympathize with the older traditions of religious life, and to cherish them as a factor in national well-being. He was educated at a school kept by Abraham Shackleton, a member of the Society of Friends, at Ballitore, County Kildare, and ever afterwards spoke in the warmest terms of the training he had received there. He afterwards was entered at Trinity College, Dublin, and studied there 1743–1748. Burke's political career does not fall within the purview of this notice; but his influence is important in the history of education because of his eloquent defense of the ancient educational institutions of England against Jacobinical attacks. He interpreted to Englishmen the significance of their own traditional forms of higher education, and showed how closely intertwined they were with the social and political institutions of the country. The most striking passage on this subject is found in the *Reflections on the Revolution in France.* Burke impressed his point of view upon the most thoughtful among conservatively minded Englishmen, and caused them to see that, in order to secure the safety of the older institutions of learning, it was necessary to bring about searching reform from within. Burke's influence, together with the lessons drawn from the French Revolution, may be traced in the work of Cyril Jackson, Dean of Christ Church, to whom was chiefly due the reform of studies at the University of Oxford in the year 1800. Burke was also the progenitor of the view of national education taken by Wordsworth, S. T. Coleridge, and Dr. Thomas Arnold of Rugby (*q.v.*). M. E. S.

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BURLESON COLLEGE, GREENVILLE, TEX. — A coeducational institution belonging to the Baptists of Texas. Preparatory, normal, collegiate, musical, and commercial departments are maintained. The college courses, which are based on approximately 5 points of high school work, lead up to degrees. There is no division into classes by years, but the certificates, diplomas, and degrees are given for actual work done. There is a faculty of 9 instructors.

BURR, AARON (1716–1757). — Educator, graduated at Yale College 1735; principal of private school at Newark, (1737–1748); president of the College of New Jersey (now Princeton) from 1748 to 1757; author of the *Newark Grammar.* W. S. M.

BURRITT COLLEGE, SPENCER, TENN. — A proprietary coeducational institution. Primary, intermediate, preparatory, and collegiate courses are given. The last course is based on approximately 4 points of high school work.

BURRITT, ELIHU (1811–1879). — Self-educated, and devoted a large part of his life to movements intended to promote self-education; active in the American Lyceum and other popular educational movements; author of numerous works calculated to aid in self-education. W. S. M.

BURROWES, THOMAS HENRY. — Schoolman and author, born at Strasburg, Lancaster Co., Pa., Nov. 16, 1805; educated by private tutors and at Trinity College, Dublin, and Yale College; private tutor; state superintendent of public instruction in Pennsylvania (1860–1863); superintendent of the Soldiers' Orphans Schools in Pennsylvania (1864–1869); president of the Pennsylvania State College (1869–1871); author of *Pennsylvania School Architecture,* and editor of the *Pennsylvania School Journal* (1851–1870). W. S. M.

BURSAR, BURSARY. — A term derived from the Greek, originally " hide," Latin *bursa,* English *purse.* The word soon took on the meaning of a " chest " or box where money was deposited for the support of students. Such sums of money were applied to the maintenance of halls of residence at the University of Paris and the German universities. The halls were known as *Bursch* and the students living in them as *bursarii* or *boursiers.* The halls of residence were under the charge of a *Rector bursae.* The term *bursarii* came to be applied to all students who received support from the university chest. In the monasteries the monk who had charge of financial matters was called *bursarius.* Both meanings have been retained in the modern use of the word *bursar.* In universities and colleges in England and the United States the official who has charge of the financial management is called a *bursar.* In Scotland, however, the *bursar* is a scholar at school or at the university who holds a *bursary* or scholarship, although it was only until recent times that bursaries were restricted to poor scholars and not thrown open for competition. In England the terms *bursar* and *bur-*

sary have recently been introduced in the Scotch sense to refer to "those boys or girls who intend to become in the future elementary school teachers and are attending full time at a secondary school . . . but require assistance in order to render their continuance at the School financially possible."

See SCHOLARSHIPS AND FELLOWSHIPS; TRAINING OF TEACHERS IN ENGLAND.

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BURSCHENSCHAFT. — The name of a student organization in German universities. It was formed in Jena in 1815 in opposition to the *Corps* (*q.v.*) or *Landsmannschaften,* which had got into bad repute through their luxury and excesses. Its aim was to establish a Christian, national character in the universities of Germany. The *Burschenschaften* quickly won favor with a large section of the professors and students, and spread to other universities. Politically these organizations rallied to the call of Fichte and Jahn for a national revival. They opposed the foreign influences in Germany at that time and the police control. This opposition found expression at the festival on the Wartburg in commemoration of the Reformation, 1807. As a result of this meeting the *Allgemeine deutschen Burschenschaften* was formed in 1818. The political activity of some irresponsible members brought down the suspicion of the government and led to such extreme measures as press censorship, the dissolution of student associations, and supervision of the universities (Karlsbad Decree). But the associations continued in secret or under different names. In 1840 the *Burschenschaften* were split into two sections, — the *Arminia* and the *Germania* — the one standing only for national freedom, the other for larger political activity. Since 1848 these associations have had a good influence in fostering national feeling among the students in the universities. A third division was formed — the *Teutones* — which combined the principles of the *Burschenschaften* and the *Landsmannschaften.* In 1874 the *Allgemeine Deputierten-Konvent* was formed as a central executive body for the *Burschenschaften.* Since 1883 another student society has developed under the title of *Die deutsche Burschenschaften* to put down excessive luxury and dueling among the students. The central executive body for this organization is the *Allgemeine deutsche Burschenverband.*

As distinguished from the *Landsmannschaften,* the *Burschenschaften* recruit their members from the masses of the student body, and nominally are not so narrow or exclusive as the older organization. The service of the *Burschenschaften* has been to abolish the unclean and dissipated student life of the early nineteenth century and to develop a strongly loyal and patriotic body among the educated classes.

See CORPS.

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BURTON, ROBERT (1577–1640). — Author of the *Anatomy of Melancholy.* Educationally this book is remarkable not only as a storehouse of classical learning, but as an indication of the state of knowledge and attitude toward modern subjects which prevailed at Oxford, long the home of the author. There is displayed a good acquaintance not only with the early but the contemporary foreign geographers and cartographers. On geography as a subject — "to charm the mind with sweet delight, to stir it by the incredible variety and pleasantness of the world to a fuller knowledge of itself" — he grows eloquent. Burton shows equal enthusiasm, and displays an equal amount of knowledge of the contemporary state of biology and mathematics. A man of wide interests he is well described by Anthony à Wood as "an exact mathematician, a curious calculator of nativities, a general read scholar, a thorough-paced philologist, and one that understood the surveying of land well."

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BURTON, WARREN (1800–1866). — Active worker in the lyceum and other popular educational movements; was graduated from Harvard College in 1821. He was directly interested in the notions of domestic education advocated by Pestalozzi. Author of *District School as it Was* and *Helps to Home Education.* W. S. M.

BURY, RICHARD DE (1281–1345). — Born at Bury St. Edmonds, the son of Sir Richard Aungerville, in 1281, this sole English representative of humanism in the early Renaissance adopted as his name the name of his birthplace. His intellectual gifts marked him out for orders and for great distinction. He passed from Oxford to Durham, when he became a Benedictine monk. He was selected as tutor for the prince who was to become King Edward III. On the accession of his pupil he received many honors, was ambassador to Pope John XXII in

1333, was made Dean of Wells, Bishop of Durham, and (in 1336) High Chancellor and Treasurer of England. He traveled largely in France and Germany as English ambassador. But he managed to carry out his episcopal duties with great assiduity, and his Chancery Rolls at Durham (the earliest extant) show him to have been capable, good, and a father of the poor. But above all things he was a lover of books (though not a great scholar) and a patron of learning. He surrounded himself with learned men, such as Thomas Bradwardine (subsequently Archbishop of Canterbury) and Fitzralph, and he possessed more books than were owned by all the other bishops together (*quam omnes Pontifices Angliae*, Surtees Society, Vol. 9, *Historiae Dunelmensis*, p. 130). He overhauled the neglected monastic libraries, and saved many priceless Mss. from destruction. He founded a library at Durham College, Oxford, and drafted rules for the library based on those of the Sorbonne at Paris. He was a successor of the school of Greek and Hebrew learning created by Grosseteste and Bacon, and provided his Oxford library with Greek and Hebrew grammars. We may surmise that these were the grammars written by Roger Bacon. He laid great stress on the literary side of education, and declared that he preferred literary studies to the study of law and he urged the reading of the poets. He is known to literature by his great work, *Philobiblon*, which was completed on his birthday, Jan. 24, 1345. Less than three months later he died. This was his famous work, "written as a sort of handbook to his library at Durham College. It is an admirable treatise in praise of learning, at times rhetorical, but full of genuine fervor. 'No one can serve books and Mammon,' he exclaims, and he urges the refining influence of study. He gives an interesting description of the means by which he collected his library; he examines the state of learning in England and France. He speaks of books as one who loved them, and gives directions for their careful use. ('They are masters who instruct us without rod or ferule. If you approach them they are . . . not asleep; if you inquire of them, they do not withdraw themselves; they never chide, when you make mistakes; they never laugh if you are ignorant.') Finally, he explains his rules for the management of the library which he founded. The work is an admirable exhibition of the temper of a book lover and a librarian" (Creighton). Toward the end of the work he declares that he had long "cherished the fixed resolve of founding in perpetual charity a hall in the revered University of Oxford, the chief nursing mother of all liberal arts, and of endowing it with the necessary revenues, for the maintenance of a number of scholars, and, moreover, to furnish the hall with the treasures of our books." He never fulfilled this purpose, but he built a library for his books, and this survived the Tudor destruction of the monastic College of Durham, and still remains beside the Trinity College that arose on the ruins of Durham College. At the Dissolution "some of the books went to the Bodleian, some to Balliol College, and some to Dr. George Owen of Godstow, who purchased Durham College from Edward VI." (See Camden's *Britannia*, 1772, p. 310.) The catalogue has not survived. Richard de Bury died Apr. 14, 1345, before the Black Death (*q.v.*) had come to revolutionize English education; but his life and scholarly ambitions show that even before the Black Death, in days when the Anglo-Norman dialect (*q.v.*) was still the medium of instruction in the schools, education had passed out of the purely medieval stage and was bending toward humanism and general culture. Unless we appreciate the intellectual attitude of Richard de Bury, we shall fail to appreciate the later tendencies of medieval education in Europe. J. E. G. DE M.

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BUSBY, RICHARD (1606–1695). — Headmaster of Westminster School; the great schoolmaster of the seventeenth century. He was born at Sutton, Lincolnshire, Sept. 22, 1606. His father removing to Westminster soon after, he went to Westminster School, and was elected thence to a studentship at Christ Church, Oxford, where he matriculated Feb. 10, 1625–1626. His parents were evidently poor, as when he took his B.A. degree in 1628, the vestry of St. Margaret's gave him £5 toward his expenses, and another £6. 13. 4 to enable him to take his M.A. degree on June 18, 1631. He spent some 7 years as a tutor at Christ Church. In 1638 he was appointed temporarily Master of Westminster by the canons to fill the place of Osbaldiston, deprived for calling Archbishop Laud "a meddling Hocus-pocus." On Dec. 14, 1640, he was confirmed in "the office and room of Schoolmaster" with £20 a year stipend and 20 marks (£13.6.8) in lieu of "diet," that is, his commons at the common table of the "College" of Westminster. In this office Busby stayed for no less than 55 years. He duly conformed to all the changes of régime and religion which the Civil War, the Restoration, and the Great Revolution of 1689 produced. He must have taken the Presbyterian Covenant in 1644 and the Engagement to the Commonwealth in 1649, and must have been more than passively Parliamentarian in his utterances, or he would not have kept his place. For in 1642 the Chapter was sequestered. An ordinance of Nov. 18, 1645, made a joint committee of Lords and Commons governors of the school in place of the Chapter; and when the Commonwealth was established an Act of Parliament of Sept. 26, 1649, incorporated a Governing Body of 56 persons. It was during the Commonwealth, thanks probably to the disappearance of the Chapter, that Busby raised the numbers and prestige of the school to heights unknown before. The earliest known school list of Westminster is that for 1655–1656, and shows 241 boys, though the statutes restricted the school to 120. Busby, having no less than 170 under himself, set up the first assistant master, besides the usher, at £40 a year, and gave him the fourth form to teach. The insufficiency of stipend was made up by fees from boarders, of whom, the statutory maximum being 4, Busby had 40. One of his account books, which has been preserved, shows that he made some £1200 a year; an enormous sum for those days. His reputation seems to have been due rather to the intellectual activity he awoke in the boys and to their social status than to any system of teaching. "He had the power," says Steele, "of raising what the lad had in him to the utmost height in what nature designed him. . . . His scholars were the finest gentlemen or the greatest pedants in the age." A famous contemporary master, Charles Hoole (*q.v.*), reports that Westminster scholars made orations and verses, not only in Hebrew, but in Arabic and other oriental languages. A list of 13 bishops educated by him has been produced; and Dryden, Locke, Atterbury, and Prior were his pupils. His reputation as a mighty flogger rests on no very sure foundation. He left few writings behind him: a Greek grammar which long held sway, a Hebrew grammar published after his death, and an Arabic grammar never published. The general public still know his name because of the story of his refusal to uncap in the presence of Charles II, when visiting the school, because it would never do to let the boys believe there was a greater man in the world than himself.

A. F. L.

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BUSINESS ADMINISTRATION. — See Commercial Education.

BUSINESS COLLEGES. — See Commercial Education.

BUSINESS EDUCATION. — See Commercial Education.

BUSINESS MANAGEMENT AND MANAGER. — The office of Business Manager in our city school systems is one of relatively recent creation, and one that has arisen because of the absolute inability of Boards of Education properly to attend to the city school business, which has developed as our cities have increased in size. School Board committees, no longer able to handle the business of the system in an acceptable manner, are being forced by necessity to delegate it to officers selected because of expert ability. The Superintendent of Instruction, too, to whom business affairs were frequently delegated, has seen a great increase in his duties along the educational side, and can no longer look after business interests, except at a great educational sacrifice.

A Secretary, or Clerk for the Board, is usually the first appointment in small cities, and he assists both the Board and the Superintendent. In a number of our larger cities good business methods have been introduced into the management of the school system, and a differentiation of official functions has taken place within recent years which has resulted in the appointment of a number of new officials. To these officials have been assigned definite executive functions; they have been paid a good salary, and they have been placed under heavy bonds for the faithful performance of their duty. The Board of Education has then withdrawn from the work of management, and has become a legislative rather than an executive body. Under these new conditions, the Board decides policy, fixes appropriations, and determines lines of action. Once this has been done, it is then the duty of the different officials to follow the line of procedure or policy determined upon by the Board. This makes the Board of Education a unifying legislative body, and delegates the executive work to officials selected because of special ability along those lines.

The Business Manager is one of the new officials evolved. To the Business Manager, or Business Agent, is usually assigned the duty of keeping a complete set of books or accounts, and an itemized record of all income and expenditures; of issuing all warrants for the payment of regular employees, and for all labor and materials furnished; of approving all requisitions for supplies and material; and of classifying and recording all expenditures of whatever kind. Under close direction of the Board, he acts as its financial agent, and is permitted to incur a limited indebtedness, and to act in emergencies without previous authorization. Where no other officials exist for the special purpose, he handles the purchase and distribution of all school supplies; employs and oversees the janitor and engineering force in the care and management of the school property; executes all contracts for the Board; and oversees the construction and repair of school buildings.

The original Cleveland Plan (*q.v.*) was for the Business Manager (there called School Director) to appoint all other officials and employees, even including the Superintendent of Instruction and the recommendation of the Chicago Educational Commission (*q.v.*) was that the Business Manager should appoint and control all employees except the members of the Department of Instruction. The plan followed within recent years, in the reorganization of city school systems, however, has been for the Board of Education to appoint all heads of departments, define the duties of each, and then hold each responsible for efficient and coöperative service. The result of the creation of these new executive officials is that the Board of Education has been freed from all executive functions, and now acts much as a board of directors for the management of a large corporation. The Superintendent of Instruction and his assistants, too, have been freed from all business affairs, and now have only the educational work of the schools to look after.

The separate articles on the different city school systems in cities of 100,000 inhabitants or over, as well as the article on City School Organization (*q.v.*), give detailed information as to the differentiation of functions, and the officers provided, in the different cities. See, in particular, the articles on BOSTON, CLEVELAND, CHICAGO, and ST. LOUIS, and on CITY SCHOOL ADMINISTRATION. E. P. C.

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Rules and Regulations of Various City School Systems.

BUSINESS OFFICER. — See BUSINESS MANAGEMENT AND MANAGER..

BUSS, FRANCES MARY (1827–1895). — A leader in the movement for the higher education of girls and women in England. Like Miss Beale (*q.v.*), with whom she had much in common, she contributed to an awakening in the education of girls, departing from the tradition then prevailing of teaching only " the accomplishments." To her the ideal education for girls was to include the same subjects as were taught to boys. Miss Buss began teaching at a very early age as a pupil teacher. At the age of 18 she assisted her mother in a private school which they opened in partnership. She continued to teach and study in day and evening classes at Queen's College, London, which was opened in 1848. The school grew rapidly in numbers, and developed into the North London Collegiate School for Ladies. In 1865 through the efforts of Miss Buss, girls' schools were permitted to take the papers set for the Cambridge Local Examinations, which were thrown open to girls in 1867. Miss Buss' success was recognized by her election in 1873 to an honorary fellowship in the College of Preceptors. In 1874 she became the first president of the Head Mistresses' Association. Miss Buss took an active part in the movement to establish kindergartens and training colleges for women for secondary schools. In the establishment of Girton and Newnham Colleges at Cambridge, she took a strong interest, and many of the students there came from her school. She was influential in securing permission for women to proceed to degrees in the University of London. In 1870 she surrendered the property in her school, which was placed in trust as a public foundation. The new institution received the title of the North London Collegiate and Camden School for Girls, including two schools, an upper and lower, the latter charging lower fees and only carrying the pupils up to 16 years of age. In all contemporary movements for the higher education and emancipation of women Miss Buss' influence was felt. Miss Buss was a woman of great personality and untiring energy, endowed with remarkable organizing ability. Like Miss Beale her influence on education of girls in England was exercised through the number of headmistresses who came from her school and the readiness with which she was ever ready to advise.

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RIDLEY, ANNIE E. *Frances Mary Buss and her Work for Education.* (London and New York, 1895.)

BUSY WORK. — A term applied by primary teachers to the activities assigned to one group of young children, still incapable of reading or writing, during the period when the teacher is busily engaged in teaching another group. The work is usually designed to keep the children pleasantly engaged until the teacher is able to reassume personal direction of them. The need for " busy work " occurs in large " receiving " or " first grade " classes, and usually consists of some form of activity at the desks, such as drawing, arranging of blocks or forms, selecting familiar words, word building, etc. The term is less used now than formerly. It is becoming more clearly recognized that profitable educative activities may be assigned to the youngest children, hence there is less need for mere " busy work." H. S.

BUTLER, CHARLES. — An English schoolmaster and grammarian who was the master of Basingstoke Grammar School, 1593–1600, and afterwards master of the Song School of Magdalen College, Oxford. His *Rhetoricae Duo Libri* (Oxford, 1598), though written in Latin, introduced specimens of English verse from Spenser's *Faerie Queene*. Butler's *Rhetoric* was written for the use of schools, and ran through 11 editions. He wrote in English, *Principles of Music for Singing and Setting; with the twofold use thereof* (*Ecclesiasticall and Civic*) (London, 1636). In the Dedication to Prince Charles he considers grammar and music should never be separated in the teaching of children, for each needs the other. Butler, further, wrote the *English Grammar* (Oxford, 1633), which is of particular interest from the etymology of the index. The book is a genuine accidence of the English Language. He maintains that the uncertainty of our writing in English is due to the imperfection of our alphabet. He utilizes Anglo-Saxon signs for the different sounds of *th*, and makes other innovations. He quotes a passage from Sir John Price, *Remains*, that four secretaries writing in English from dictation differed in the letters used, while the same number of Welshmen "varied not in any letter." In 1609 Butler had published a book at Oxford on the *Feminine Monarchie, or a Treatise concerning Bees.* In 1634 this was reproduced so as to illustrate the phonetic spelling advocated in the *English Grammar* of 1633: the *Feminin 'Monarchi' or the Histori of Bees*, etc. In 1629 Butler published *Oratoriae Libri duo* (Oxford) for the use of schools. This was reprinted in 1633, and in a new dedication it is stated that Butler's *Rhetoric* was used in the chief schools of the kingdom. F. W.

BUTLER COLLEGE, INDIANAPOLIS, INDIANA. — A coeducational institution, founded as the Northwestern Christian University, and legally styled Butler University, chartered by the Indiana legislature Jan. 15, 1850, and opened Nov. 1, 1855. The original funds were subscribed by members of the denomination known as the Disciples of Christ, the "Christian Church," or "Campbellites." The institution at first occupied the buildings of the old Northwestern Christian University, Indianapolis. The College of Liberal Arts has had an uninterrupted existence; other schools have from time to time been affiliated with Butler University or established by its directors. Butler University (the corporate name) is a stock company controlled by a Board of Directors, the 21 members of which are elected by the stockholders. The trustees elect their president from their own number, and choose a secretary and a treasurer either from among themselves or from the stockholders. In 1875 the institution was removed to Irvington, a suburb of Indianapolis; the name was changed on Feb. 28, 1877, from "Northwestern Christian University" to the present title, in recognition of the benefactions of Ovid Butler. By resolution of the Board of Directors the name "Butler College" was adopted Apr. 8, 1896, to designate the undergraduate department. In connection with this school, there are maintained a preparatory department, courses in music and art, a summer session (established 1908), a Teachers' Training Course (1909), extension courses for teachers, and graduate courses leading to the degree of M.A. The institution plans to establish a Graduate Divinity School; meanwhile, a number of courses of importance to ministers are grouped under the head of a "School for Ministerial Education." Associated with Butler College are the Indiana Law School and the Indiana Dental College, both in Indianapolis. In 1898 Butler College affiliated with Chicago University, the latter institution granting privileges to students of the college, candidates for a Chicago degree; this affiliation will be dissolved in 1910. Benefactions recently (1909) received are: from Mr. Joseph I. Irwin, $100,000; from Mr. Marshal T. Reeves, $25,000; from Mr. Charles T. Whitsett, $12,500; and from Mr. Andrew Carnegie, $25,000, this last donation completing the fund of $250,000 called for by the conditions of Mr. Whitsett's gift. In 1906, the grounds, buildings, and equipment were valued at $227,000. The total annual income is $19,702. The average salary of a professor is $1250. There are (1909) 25 members on the instructing staff, of whom 13 are full professors. The students number 507, divided as follows: college, 190; graduate students, 6; sub-freshmen and specials, 32; extension, 141; department of Art, 26; Teachers' Training Course 28, Summer Session 101. Thomas Carr Howe, A.M., is president. C. G.

BUTZBACH, JOHANN (1477–1526). — Prior of the monastery at Laach. He was born in 1477 at Miltenberg, whence he called himself Piemontanus. At an early age he joined a wandering student (*q.v.*) as an A-B-C shooter (*q.v.*) in the hope of obtaining an education in that way. His ambitions were, however, frustrated, and although he gained considerable worldly experience from his wanderings and hardships in Bohemia and the south of Germany, he failed to learn anything. After returning to his home he turned his attention to tailoring. On entering the monastery at Johannisberg as tailor, his desire for knowledge was again kindled, and he was sent at the age of 21 to the famous school at Deventer (*q.v.*), where he made very rapid progress. At the request of the Abbot of Laach he was with some other pupils recommended to enter the monastery there, which he did in 1500. Butzbach is chiefly of interest for a delightfully naïve account of his wanderings and his life up to the time of his entry into the monastery at Laach. The *Hodoporicon*, or *Little Book of Wandering*, like the *Autobiography* of Thomas Platter (*q.v.*), gives an excellent picture of the life of the wandering student, and differs from it in the simplicity of the descriptions of the country, people, and manners with which Butzbach came into contact. Butzbach was a prolific writer in prose and verse, but with exception of the *Hodoporicon*, the majority of his works have remained unedited in the Bonn Library. Among his other works is an *Auctuarium* (or *Supplement*) to the *De Scriptoribus Ecclesiasticis* of Abbot Trithemius of Sponheim, containing 1155 biographies.

See Bacchants.

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CABANIS, PIERRE JEAN GEORGE. — A distinguished French physician, psychologist, and politician, born at Cosnac in the year 1757, died at Meulan in 1808. As a youth he was dismissed from the College of Brives on account of his independent spirit. Later he studied at the University of Paris. After spending two years as a private secretary at Warsaw he returned to Paris and devoted himself to literature, but at the request of his father renounced his literary ambition and took up the study of medicine. In 1789 he was appointed administrator of hospitals in Paris, and later Professor of Hygiene, and in 1797 Professor of Clinical Medicine. He became a member of the Institute in 1796. He was a member of the Council of Five Hundred and later a member of the Senate.

His chief work, *Rapports du physique et du moral de l'homme*, was in reality a treatise on physiological psychology. All higher intellectual activities he derived from sensation, which, in turn, was dependent on physiological and physical conditions.

Among the papers of his intimate friend, Mirabeau, was found the manuscript of a *Travail sur l'instruction publique*, which expert opinion has attributed to Cabanis, by whom it was also edited and published. There are four discourses in the collection. The first treated of public instruction and the organization of the corps of teachers; the second concerned public festivals, civil and military; the third discussed the establishment of a national Lycée; the fourth dealt with the education of the heir to the crown. Cabanis favors general education under state authority, but does not go so far as to make education compulsory or gratuitous. Instruction in the national Lycée, or university, might be free to a limited number of chosen youth. There should be a classical secondary school in each department, with instruction in Greek, Latin, oratory, science, and philosophy. These propositions were made at a time when France had no system of public instruction. The later years of the Revolution brought forth plans of a much more radical character. S. W.

CAEN, UNIVERSITY OF. — Founded in 1432 by Henry VI, when Normandy was under English control, in opposition to the University of Paris. The faculties which were gradually established were in law, theology, and medicine. The Papal bull was obtained in 1437, in spite of much opposition from Paris. A new charter was received from Charles VII in 1452, giving the same privileges as those enjoyed by Paris. The history of the university down to the Revolution was one of decline, and at that period it was closed. It was reëstablished in 1894, and received the status of state university in 1896. At present the university includes faculties of law, letters, sciences, and a preparatory school of medicine and pharmacy. In 1909 there were enrolled 719 students, of whom 384 were in the faculty of law.

See France, Education in.

CÆSAR, GAIUS JULIUS. — The greatest of the Romans, the "perfect man," according to Mommsen's exaggerated tribute, is famous as a warrior, a statesman, and a man of letters. As a warrior he conquered and added to the Roman dominion the province of Gaul, which he subdued so thoroughly that it remained an integral part of the Roman Empire without disturbance for centuries. He also in the civil war against the dominant parties at Rome obtained the headship of the Roman world, and made himself the founder of a dynasty which in various forms lasted for a thousand years. As a statesman he reorganized a moribund government and laid the foundations for modern civilization. As an author he wrote an account of his campaigns in Gaul and in the civil war which have taken rank as important historical sources and one of which at least has been one of the chief reading books in schools for centuries.

The life of Cæsar was written by Suetonius in his *Lives of the Twelve Cæsars* and by Plutarch. There are also numerous references to him in the literature of his period and later. On these sources modern discussions of the events of his life have been based. The most available and practical for teachers is that by Warde Fowler (New York, 1892). The sketch by Froude (New York, 1884) suffers from the faults of Froude's historical method, but is well worth reading. A short sketch by Trollope (New York, 1885) adds nothing to the subject. Baring-Gould's chapter (The Tragedy of the Cæsars, New York, 1907) is popular, but not of great value. There are, of course, other treatments in French and German, etc. An analysis of his character is given also in Mommsen's *History of Rome* and in Merivale's *History of the Romans*, both of which are well worth careful study. Those who are interested in the military side of Cæsar's career will find this treated at great length in Colonel Dodge's *Cæsar* (New York, 1892). To the comprehension of his work in Gaul much has been contributed by the work carried on under the auspices of Napoleon III, entitled *Histoire de Jules César* (Paris, 1865). This great work is particularly valuable for the detailed surveys and plans of the various battlefields, and has rendered further investigations in this line almost superfluous, though occasional studies have since been made of individual campaigns. The subjugation of Gaul has been made the subject of a very extensive study by Holmes. *Cæsar's Conquest of Gaul* (London, 1899), which, in addition to a paraphrase of the narrative of the Gallic War, contains in a series of appendices exhaustive treatment of all questions of ethnology, trustworthiness, and military management. This book has been supplemented for Britain by a similarly exhaustive treatment by the same author, entitled *Ancient Britain and the Invasion of Julius Cæsar* (Oxford, 1907).

During the last two centuries the Gallic War has been a household word among all who have had the advantages of a high school or college education. This is due to the fact that according to the system of instruction in vogue during this period the *Commentaries on the Gallic War* have been the first Latin work with which students of Latin have become acquainted. This was not always the case, for in the improvement in teaching which began with the Revival of Learning when Latin was studied as a living tongue, the chief model of style was Cicero, and outside of Cicero only authors of a distinctly literary character, such as Vergil, Horace, Terence, Seneca, were read. Cæsar was read in courses in history, which need not surprise us when we remember that in the Middle Ages most of the textbooks on all subjects were written in Latin. In the course of time other authors than Cicero came to be used in the schools, but it was not until the latter part of the eighteenth century that Cæsar came to be regarded as the main author for early reading. The first actual mention of Cæsar's *Commentaries* in the statement of requirements for admission to college is found in the announcement of Columbia College for the year 1786, where it is provided that the candidates for admission must be able to render into English Cæsar's *Commentaries on the Gallic War*, 4 orations of Cicero against Catiline, the first 4 books of Vergil's *Æneid.* In the requirements for admission to Princeton in 1794 we find Sallust and Cæsar's *Commentaries* substituted for Tully's Orations. Since that time the curriculum in Latin has fluctuated more or less, but Cæsar's *Commentaries on the Gallic War* have held their place.

The early editions of Cæsar were not distinguished particularly for critical accuracy. The commentaries of the Middle Ages and later turned particularly on matters of content. The first attempt to settle the text of Cæsar on a scientific basis was made by Nipperdey in his edition (Leipzig, 1847). In an exhaustive study of the various manuscripts of Cæsar, Nipperdey discovered evidences of two families of Mss. which had come by separate transmission from an archetype of perhaps the third or fourth century. We have no manuscripts of Cæsar earlier than the ninth or tenth centuries, but we have a large number of good ones from this period. Nipperdey came to the conclusion that altogether the manuscripts of one family (α) were to be preferred to those of the other (β), and this view was dominant until the edition of Meusel (Berlin, 1894). Meusel, after another exhaustive study of the manuscripts, came to the conclusion that the second family of manuscripts (β) was the more trustworthy, and his authority was regarded as preëminent for some years. In the edition of the Oxford text by Du Pontet (Oxford, 1900), however, we find the first family again regarded as the more important. Practically both families are of equal value, and in a difference of reading it is often impossible to prefer the one to the other.

The fact that during the last two centuries Cæsar has been read particularly in the schools has probably been the reason why no extensive editions of the *Commentaries* with notes have appeared. Stock's edition of the *Gallic War* (Oxford, 1898) has a pretentious but not very valuable introduction, and a poor commentary. Numerous school editions have been published in all the European languages, and great efforts have been made to improve these editions by maps and illustrations of every conceivable variety. The maps have been taken largely from Napoleon, the illustrations from Trajan's column, but often photographs of the battlefields as they appear to-day have been inserted. Oehler's *Bilder Atlas* (Leipzig, 1890) is important in this connection, as well as Gurlitt's *Anschauungstafeln* (6 charts; Gotha), while the best collection of lantern slides (about 400 in number) may be obtained from George R. Swain, Bay City, Mich. A small but serviceable book is Judson's *Cæsar's Army* (Boston, 1894).

The language of Cæsar has been made the subject of careful study, particularly in the lexicons of Meusel (Berlin, 1887), Merguet (Jena, 1886), Menge, and Preuss (Leipzig, 1885). Studies in the syntax from the point of view of teaching have been made by Heynacher (Berlin, 1886).

A complete bibliography may be found in the books above quoted and in Teuffel's *History of Latin Literature* (translation by Warr, London, 1891). For Methods of teaching Cæsar, see LATIN, TEACHING OF. G. L.

CÆSAREA, SCHOOLS OF. — See CATECHETICAL SCHOOLS.

CAGLIARI, UNIVERSITY OF. — Founded by Papal bull in 1606, receiving the sanction of Philip of Spain in 1620. It was inaugurated in 1626. The institution met with very little success until it was restored in 1764 by the rulers of the House of Savoy. Its statutes have been frequently revised since then. Faculties of law, medicine, and pharmacy, and sciences are maintained. In 1908–1909 there were in attendance 245 students, almost half the number being in the faculty of law.

See SPAIN, EDUCATION IN.

CAIRD, EDWARD. — Born at Greenock, Scotland, 1835, and died at Oxford, England, 1908. After being a Fellow at Balliol and at Merton colleges, he was appointed to the professorship of moral philosophy in the University of Glasgow. After 27 years' service at this post, he succeeded, in 1893, Benjamin Jowett as Master at Balliol. Ill health led to his resignation in 1907. His whole life was devoted to the educational interests in teaching and writing, representing the full claims of modern idealism. He early began a study of the speculative philosophy of the Continent of a century ago. He philosophized for himself by interpreting and criticizing the views and systems of others. In seeking to make secure the foundation of an idealistic, spiritual conception of the world, he became one of the sharpest critics of recent empiricism in English thought. His intellectual powers were tempered by the universal element of fairness which ever sought to bring to light the truths which might lie imbedded in the views of those he criticized. He also wrote on religion, literature, and politics. As a teacher as well as an author he sought for an expression of a philosophy which would reconcile and unify all the aspects of experience. His chief works are *The Philosophy of Kant* (1878), *Hegel* (1883), *Social Philosophy* and *Religion of Comte* (1885), *Critical Philosophy of Immanuel Kant* (1889), *Evolution of Religion* (1893), *Fundamental Ideas of Christianity* (1899), and *Evolution of Theology in the Greek Philosophers* (1903). E. F. B.

CAIUS. — A learned priest of the Church of Rome, and a disciple of Irenæus, born about A.D. 180. At a time when there was but little learning in the Roman Church he won a high reputation as an eloquent and erudite teacher of religious truth. For information about his life and work we are dependent almost entirely upon the *Ecclesiastical History* of Eusebius (II, 25 and VI, 20). Like the other leaders of the Roman Church in his day, he wrote in Greek. His chief literary work was *The Disputation*, a dialogue in which he argued with Proclus, the leader of the Phrygian heresy. Fragments of this have been preserved by Eusebius, a translation of which is given in the *Ante-Nicene Fathers*, Vol. V. He also combated the Millenarian theories, but his writings on this subject have been lost. To him has been ascribed the authorship of the celebrated *Muratorian Fragment*, discovered in the Ambrosian Library at Milan in 1740, and of great value as a summary of the opinion of the Western Church on the Canon of Holy Scripture shortly after the middle of the second century. It is translated in Vol. V of the *Ante-Nicene Fathers*, and the original is given (with valuable critical comments) in Westcott on the *Canon*, pp. 521–538. To him also were formerly attributed three works — *A Treatise Against all Heresies*, *The Little Labyrinth*, and *A Treatise on the Universe* — but these are now assigned by almost universal consent to his contemporary, Hippolytus. W. R.

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CAIUS, JOHN (1510–1573). — Physician and scholar. After studying at Gonville Hall, Cambridge, he became fellow of that institution. At first he devoted himself to the study of theology, but later changed his mind and went to Padua in 1539, where he studied medicine. In 1541 he lectured at the University of Padua on the logic and philosophy of Aristotle. After leaving Padua he traveled in Italy, and in his work *De Libris propriis Liber* he gives an account of the educational conditions of the time and of the libraries. He also traveled in France and Germany, collating Mss. of Galen and Hippocrates. As a result of his investigations he added to the Cambridge controversy on the question a work *De Pronuntiatione Graecae et Latinae*, supporting the old school. On his return to England he gained eminence as a physician in London, Norwich, and Shrewsbury. He was royal physician to Edward VI, Mary, and Elizabeth. In 1557 he devoted his wealth to the endowment and refoundation of his old college, which came to be known as Gonville and Caius College. In 1559 he became Master of the institution, but was never happy there, owing to friction with his colleagues. Always suspected of adherence to Catholicism, he could not survive the burning of vestments and ornaments which were found in his rooms. Caius took a deep interest in everything that affected his university and college. For the former he entered into a controversy with an Oxford namesake on the comparative antiquity of the two universities, and published in 1568 *De Antiquitate Cantabrigiensis Academiae, libri duo*, and in 1574 he wrote *Historiae Cantabrigiensis Academiae ab urbe condita, libri duo.* He also wrote the *Annals of Gonville and Caius College* from the foundation, but this is only preserved in Ms.

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CALCOTT, LADY MARY (1785–1842). — Wife of Sir Augustus Wall Calcott, the painter. In addition to descriptions of her many travels, which included India, South America, and Southern Europe, she is best known for her children's books. The most famous of these is *Little Arthur's History of England*, 1835. In 1841 she published *The Little Brackenburners* and *Little Mary's Four Saturdays.* While in Valparaiso she acted as tutor to Donna Maria, who later became Queen of Portugal.

CALCULATE. — From the Latin *calculare*, to compute; from *calculus*, a pebble, pebbles being used by the Romans in computation on the abacus (*q.v.*). The word is used in elementary teaching particularly with reference to mensuration, as to calculate the volume of a cylinder. It has of late been replaced in the schools by the simpler word "find," although the latter is not so expressive of the numerical work to be done. D. E. S.

See also CALCULUS.

CALCULI. — See ABACUS.

CALCULUS. — The Latin word for pebble, used by the Romans to designate the small counters used on the abacus (*q.v.*). At present it is loosely used to mean various methods of analysis, but is commonly taken to designate the differential and integral calculus, a branch of mathematics that has developed from the infinitesimal calculus founded chiefly by Newton and Leibnitz.

Differential and Integral Calculus. — That branch of analysis which studies differentials and integrals. If a function of x be given, as $y = f(x)$, and if we take some arbitrary value of x as x_0, we have $y_0 = f(x_0)$. If, now, we let x_0 take an increment Δx, we may say that $x_0 + \Delta x = x'$. Then y' will equal $f(x')$, and we shall have $y' = y_0 + \Delta y$. Then $y_0 + \Delta y = f(x_0 + \Delta x)$, whence, by subtracting and dividing,

$$\frac{\Delta y}{\Delta x} = \frac{f(x_0 + \Delta x) - f(x_0)}{\Delta x}$$

Then as Δx approaches 0 as a limit, we shall have

$$\text{limit of } \frac{\Delta y}{\Delta x} = \text{limit of } \frac{f(x_0 + \Delta x) - f(x_0)}{\Delta x},$$

and this limit is called the derivative of y with respect to x and is written $D_x y$. From this is derived the relation $dy = D_x y\ dx$, in which dy is the differential of y and dx is the differential of x.

It is impossible within reasonable limits to give any satisfactory description of the subject. For this the reader must refer to standard works on the calculus.

The following is a typical problem in maxima and minima, as solved by the calculus: Find the most advantageous length for a lever by means of which to raise a weight of 100 pounds, if the distance of the weight from the fulcrum is 2 feet and the lever weighs 3 pounds to the foot. If the weight of the lever is not considered, the longer the lever the less the power required, but soon the lever becomes too heavy to be used advantageously. The result is found by the calculus to be 11.4 feet, the power then being 34.6 pounds. (Osgood.)

The reverse of differentiation is called *integration*. That is, if the differential of x^2 is $2x\,dx$, then the integral of $2x\,dx$, written $\int 2x\,dx$, is x^2, or x^2 + some constant. The following is a typical problem in the integral calculus: A water main 6 feet in diameter is half full of water. Find the pressure on the gate that closes the main. The pressure is found to be $k\int_0^3 x\sqrt{9 - x^2}\,dx$, where k is the weight of a cubic foot of water. The result is found to be 1120 pounds. (Osgood.)

The general nature of the calculus as now considered is that of a particular form of analysis dealing with differentials (the differential calculus) and integrals (the integral calculus). Of these the former is usually considered first, although a kind of integral calculus historically preceded the differential. Teachers often find it economical to take up the simplest forms of integration along with differentiation, reserving the more difficult cases until later in the course. The tendency at the present time is to make much more of the applications of the calculus than was formerly the case, owing to the extensive demands of technical education and the corresponding increase in applied problems. This movement owes much to the works of Perry and Greenhill in England, Autenheimer, Nernst, and Schönflies in Germany, and Osgood in the United States.

History. — An initial step may be said to have been made in the calculus when Antiphon (*c.* 420 B.C.) attempted to find the area of a circle by considering it as the limit of a regular inscribed polygon of n sides as n is indefinitely increased. Bryson of Heraclea, his contemporary, proceeded in an analogous fashion, and to these writers is due the ancient method of exhaustions, the exhausting of the difference in area, for example, between a rectilinear and a curvilinear figure, which is essentially what is done in quadrature problems in the integral calculus. About the same time Democritus (460–*c.* 370 B.C.) suggested the atomistic philosophy and hinted at the infinitesimal in mathematics. Archimedes (*q.v.*), in the third century B.C., extended the method of exhaustions and applied it to the quadrature of the parabola. Practically no steps were taken in the calculus from this time until about 1600, when Kepler (*q.v.*) laid down his principle of continuity in geometry and suggested the use of infinitesimals, as in the considering of a circle as a polygon of an infinite number of sides. He was followed by an Italian writer, Cavalieri (1598–1647), who developed his method of indivisibles in 1629, and published it in 1635. In this he considered a line as composed of an infinite number of points, a surface as composed of an infinite number of lines, and a solid as composed of an infinite number of planes. Although he subsequently improved his theory, the foundation was not solid enough for permanence. The theory is interesting as a connecting link between the Greek method of exhaustions and the calculus of Newton and Leibnitz. It influenced men like Wallis and Barrow in England, and Fermat, Roberval, Pascal, and Descartes in France, to consider the possibilities of using the infinitesimal in mathematical investigation.

Newton (1642–1727, *q.v.*) was a pupil of Barrow's, and was by him made acquainted with the work of his predecessors. He sought to justify the use of the infinitesimal, but by a different line of approach. He considered x and y as flowing quantities, and $\dot{x}$ and $\dot{y}$ as their velocities, and called the new science by the name of Fluxions. He worked out his theory about 1665, but published nothing upon it until considerably later.

Meantime Leibnitz (1646–1716) (*q.v.*) had probably heard of Newton's efforts, if not of his methods in detail, and had set to work upon the same problem. He developed a theory that was independent of Newton's, and suggested the notation dx and $\int x\,dx$. His theory was worked out by 1676, and he published it in 1684, thus antedating Newton's publication.

It is now generally considered that Newton worked out his theory of Fluxions (essentially the calculus based upon the theory of rates) at least 10 years before Leibnitz worked out his; that Leibnitz knew that Newton had developed a theory; that Leibnitz worked out a new theory with a new symbolism, publishing his results before Newton. The Leibnitz notation finally supplanted the Newtonian, and the foundations of both theories have been replaced by the works of later writers. The subsequent development of the subject has led to making the fundamental principles more secure, to improving the symbolism, and to increasing the range of applications.

Methods of Presenting. — There are four general methods of presenting the calculus. The first is the Method of Infinitesimals, which started with Kepler and Cavalieri and culminated in the work of Leibnitz. This assumes that dx is a very small quantity, not zero, such that $\frac{dx}{dy}$ is measurable, but such that dx is negligible with respect to x, and that $dx\,dy$ is negligible with respect to $y\,dy$. This method, while having the advantage of simplicity of treatment, has generally been discarded as entirely lacking in mathematical rigor.

The second general method is that of Fluxions, due to Newton, which has developed into the Method of Rates. This defines a differential of a function or variable, at any value, as what would be its increment in any interval of time, if at that value its change became uniform. One of the leading American exponents of this method is the textbook of Rice and Johnson. The method is not, however, as popular as the one next mentioned, although it has certain advantages in the way of concreteness.

The third method is what is now called the Method of Limits, suggested by Newton and used by him in his work on the quadrature of curves. This is the method used in the introduction of this article, and is the one generally followed in modern textbooks.

A fourth method, suggested by Lagrange in his *Théorie des Fonctions* (1813), depends upon the expansion of a function into a power series. This offers a number of obstacles, however, in the matter of convergence, and has not been considered usable for beginners.

Bibliography. — Such an extensive subject should be investigated by reference to the literature. An excellent bibliography is given in an article by Meyer in the *Encyklopädie der mathematischen Wissenschaften*, Vol. II (Leipzig, 1900). The best history of the rise of the calculus is given in Cantor, *Geschichte der Mathematik*, Vols. III and IV (Leipzig, 1908), and in Zeuthen, *Geschichte der Mathematik im* 16. *and* 17. *Jahrhundert* (Leipzig, 1903).

CALCUTTA UNIVERSITY. — See INDIA, EDUCATION IN.

CALDWELL COLLEGE, DANVILLE, KY. — An educational institution for young women. Chartered in 1854 as the "Henderson Female Institute"; the present title adopted in 1904, though the work is chiefly preparatory in character. The school is under the control of the Second Presbyterian Church. Degrees are conferred. There are 23 instructors on the faculty of the institution.

CALDWELL, JOSEPH (1773–1835). — Educator, graduated at Princeton in 1791 and was 4 years a tutor in that institution. He was professor of mathematics in the University of North Carolina from 1795 to 1804, and president of that institution from 1814 to 1835. In 1824, he made an educational tour through Europe, and in 1827 he built an astronomical observatory for the University of North Carolina, the first of its kind in the United States. Author of *Elementary Geometry* (1822) and of addresses on educational subjects. W. S. M.

CALDWELL, MERRITT (1806–1848). — Educator and textbook writer, graduated at Bowdoin College in 1828. He was principal of the Wesleyan Seminary, Me., for 4 years, and professor in Dickinson College for 14 years. He was the author of textbooks on grammar and elocution and of numerous essays on religious subjects. W. S. M.

CALDWELL, SAMUEL LUNT (1820–1889). — Was graduated from Waterville College (now Colby University) in 1839. He was several years principal of academies in New Hampshire and Massachusetts, and was president of Vassar College from 1878 to 1889. W. S. M.

CALENDAR. — The computation of the calendar played a very important part in medieval ecclesiastical education. (See COMPUTUS.) The word is from the Latin *Kalendarium*, a list of interest payments due upon the kalends (*kalendæ*) of every month. The Romans did not, therefore, use the term in the present sense, using *Fasti* to indicate a list of days in which the holidays were marked.

In medieval Europe *Fasti* was changed to *Kalendarium*, and the Spanish-Arabic *Almanac* (*q.v.*) was also used in the same sense. The earliest known Christian calendar dates from 354 A.D., and the computing of this, as of other religious calendars, expressed the highest mathematical attainments of the early religious schools.

The primitive unit of time was the day, and this was doubtless looked upon by early peoples as unvarying. With the development of the race, however, various kinds of day were distinguished. First from the standpoint of invariability came the sidereal day, the length of time of revolution of the earth as shown by observations on the fixed stars, 23 hours, 56 minutes, 4.09 seconds of our common time. First from the standpoint of the casual observer was, however, the true solar day, the length of time between two successive passages of the sun across the meridian, varying 51 seconds with the change of seasons, but answering the purposes of the world for thousands of years, and measured by the dial. As clocks of one kind or another came into use, a third kind of day became recognized, the mean solar day, equal to 24 hours, 3 minutes, 56.56 seconds, of sidereal time, and still other kinds of day are recognized by writers on chronology. The next obvious division of time was the month, originally the period from one new moon to the next. This served as the greater unit for a long time, but with increased accuracy of observation it was seen that there were several kinds of month as well as several kinds of day. Thus the sidereal month has 27 days, 7 hours, 43 minutes, 12 seconds, while the synodical month, from one conjunction of the sun and moon to the next one, averages 29 days, 12 hours, 44 minutes, 3 seconds. The next longer period is naturally the year, a period observable only about $\frac{1}{12}$ as often as the month and only $\frac{1}{365}$ as often as the day, and hence not so easily fixed. It took the world a long time to find the length of the year with any accuracy, and the struggle of the mind to harmonize the reckoning of time by days and months and years has given rise to as many different calendars as there have been different races and religions, and has rendered the subject a difficult one for the schools to treat. There are several kinds of year, the sidereal of 365.256358 days, the tropical of 365.242204 days (in 1800), the anomalistic, about 26 minutes longer than the tropical, the lunar year of 12 synodical months, and so on. In addition to these obvious periods there is the cycle, as in the lunar cycle of 19 years, the solar cycle of 28, and so on, besides the longer unit of the "period," compounded of cycles or other units. An artificial unit is also the era, the Byzantine beginning Sept. 1, 5509 B.C., the Alexandrian in 5502 B.C., the era of the Exodus in 1486 B.C., the Olympiad era in 779 B.C., the Roman in 753 B.C. (Varro) or 752 B.C. (Cato Censorius), and many others. The Christian era was introduced by the Abbot Dionysius Exiguus, *c.* 500 A.D., recognized by the Church in the sixth century, and brought into general use largely through the influence of Bede in the eighth century.

In elementary textbooks the two calendars usually mentioned are the Julian and the Gregorian. The first derives its name from Julius Cæsar, who reformed the Roman calendar by decreeing that the year 46 B.C. should have 445 days (the *annus confusionis*), and that subsequent years should have 365 days, with one leap year in every four. He changed, or attempted to change, the old custom of having the year begin with March, a custom that accounts for such names as September, and for the names Quintilis (the fifth month, changed to Julius because Cæsar was born in that month), and Sextilis (afterward changed by Augustus). The Julian calendar remained in use in Christendom until its reformation under Gregory XIII in 1582, and is still in use by the Greek Church, including the Russian branch. The Julian calendar now differs from the Gregorian by 13 days.

The development of printing and the easy distribution of almanacs naturally led to dropping the study of the calendar from the schools and monasteries, although the adoption of the Gregorian calendar in England in 1752 necessitated the retention of the chapter upon the subject in the arithmetics until the new system became generally understood. That it persisted in the American arithmetics for a century after it had served this purpose, until well toward the close of the nineteenth century, is an illustration of the conservatism of the schools and of the effect of tradition.

D. E. S.

CALHOUN, WILLIAM BARRON (1796–1865). — Statesman, graduated at Yale in 1814. He was one of the founders of the American Institute of Instruction (*q.v.*) (for 7 years its president), and was prominently associated with Horace Mann (*q.v.*) in the reform movement in Massachusetts. W. S. M.

CALIFORNIA COLLEGE, OAKLAND, CAL. — Organized in 1870 at Vacaville and transferred to its present position in 1887. It is under the auspices of the Baptists of California. Sub-academic, academic, collegiate, fine arts, and business departments are maintained. The college courses are based on about 12 points of high school work. Degrees are conferred. Very few of the students, however, remain for the college course. There is a faculty of 5 professors and 2 assistants.

CALIFORNIA, STATE OF. — Acquired by conquest from Mexico, and admitted to the Union in 1850 as the 31st state, and without any previous organization or existence as a territory. It forms a part of the Western Division, and has a land area of 156,172 square miles. In size it is the second largest state in the Union, is about three fifths of the area of Texas, and about as large as the New England states, New York, Pennsylvania, and New Jersey combined. For administrative purposes the state is divided into 58 counties, and these are in turn divided into cities, towns, and school districts. In 1900 California had a population of 1,485,053, or about one half that of the state of Massachusetts, and a density of population of 9.5 persons per square mile. Its estimated population in 1910 was 1,756,708.

Educational History. — Under the Mexican occupation the few schools which existed were church or mission schools. The foundation of the public school system was laid in the first constitutional convention, held at Monterey in 1849, when, after a long debate, the 500,000 acres of new land, granted to the states for internal improvement by Congress, was set aside for education by a majority of one vote. The legislature was then directed to provide for a State Superintendent of Public Instruction; to encourage "intellectual, scientific, moral, and agricultural improvement"; to devote to schools the proceeds of all gifts of lands; to provide for a 3 months' school in every school district in the state: and to protect and preserve the lands given for the support of a university. The first school in the state, other than mission schools, had been organized in San Francisco the year before. In 1847 a schoolhouse had been ordered to be built by the town council, and in 1848 a school board was elected and a teacher employed. The school was a tuition school, under public control, and was free only to indigent pupils. This school began with 6 pupils, soon increased its numbers to 37 pupils, and then, after the discovery of gold, dwindled to 8 pupils and was closed. In 1850 the first school ordinance in California was passed, and the first free public school was opened in San Francisco under its provisions. The first state school law was enacted in 1851. It ordered a survey of the school lands; the apportionment of the interest on the school fund to the counties on the basis of the school census, and to districts on actual attendance; and provided for the establishment of schools, and the making of school reports. Religious and sectarian schools, as well as almshouses and orphan asylums, were to share in the school fund distribution on the same basis as other schools. The first schools organized under the new law were those of San Francisco, which at once provided for a City Board of Education and a Superintendent of Schools, and organized a town school system.

In 1852 a revised school law was adopted, which contained the main outlines of the present system. A State Board of Education was provided for; constables were appointed as school census marshals; the duties of County Superintendents were laid down; a state school tax of 5 cents on the $100 was ordered, and all state money was directed to be used only for teachers' salaries; an optional county school tax of 3 cents and an optional city school tax of 3 cents were allowed; and aid to denominational and sectarian schools was forbidden. In 1853 county Assessors were directed to act *ex officio* as County School Superintendents; the county school tax was changed from optional to mandatory and raised to 5 cents; and the limit of taxation for cities, and the prohibition of aid to sectarian and denominational schools, were removed. In 1855 County Superintendents of Schools, City Superintendents of Schools, and City Boards of Education were provided for in the law; and aid to denominational and sectarian schools was finally cut off. In 1860 the State Board of Education was authorized to adopt a series of textbooks, and in 1870 this series was made uniform for the whole state. State and County Boards of Examination were also provided for.

In 1861 the question of what to do with the 16th and the 36th section school lands was finally settled by ordering them to be sold and the proceeds to be paid into the state school fund. In 1862 the first state normal school was established, and in 1869 the state university was established. In 1863 state aid for teachers' institutes was provided; new regulations were made regarding the certification of teachers; and the funding of the state's debt to the school fund was begun. In 1864 the county school tax was changed to the new basis of not less than $2 per census child, and a 5 months' school ordered. By 1865 more than half of the schools were free from "rate-bills," and in 1867 the "rate-bill" was definitely abandoned and the schools made free to every child. In 1866 the state school tax was raised to 8 cents and the county school tax to $3 per census child, and in 1874 the state school tax also was changed to the new basis and made not less than $7 per census child. In 1884 the county school tax was further raised to $4 per census child; in 1893 to $6; and in 1905 to $7.

In 1879 a new and a reactionary state constitution was adopted, the educational section of which did away with the State Board of Education and the Boards of Examiners, and provided for County Boards of Education, with power to certificate all teachers and to adopt all textbooks for the schools of the county. This soon proved unsatisfactory, and in 1884 an amendment to the state constitution was submitted and adopted which provided for an *ex-officio* State Board of Education, and made it their duty to edit and compile a state series of textbooks, and to have them printed and published by the state. Beyond this the new board was given no duties of any consequence. State authorship proved so extremely unsatisfactory that it was finally abandoned in 1903 for the purchase of copyrights, though state publication is still retained.

The first high school in the state was organized in San Francisco in 1858, but the number of high schools had increased to only 12 by 1885, and few others were organized up to 1891. The constitution of 1879 had included high schools as a part of a possible state school system, but had forbidden the use of any part of the state school fund for their support. In 1891 the Union High School Act was passed, whereby a number of districts might unite to maintain a free high school for their children, and after the passage of this act the development of high schools was rapid. In 1902 the state constitution was amended and a state high school fund created, to be raised by general taxation. Since 1903 the high schools of the state have been placed on a good financial basis. The inspection and accrediting of the high schools, begun by the state university in 1884, has done much to stimulate and standardize the schools. From 12 high schools in 1885, the number rose to 24 in 1890, 98 in 1895, 105 in 1900, 143 in 1903, and 187 in 1909.

Present School System. — The school system of California as at present organized is as follows: At the head is a Superintendent of Public Instruction and a State Board of Education. The superintendent is elected by popular election for a 4-year term, and receives a salary of $5000. He has general oversight of the schools of the state; prepares all blanks; apportions all state school money to the counties; visits the schools of the state; hears appeals from the decisions of the County Superintendents and County Boards; and compiles a biennial report. He is also *ex officio* a member of the State Board of Education, the Board of Regents of the state university, and of the different boards of trustees of the 5 state normal schools. The State Board of Education consists, *ex officio*, of the Governor, State Superintendent, president and professor of education in the state university, and the presidents of the 5 state normal schools. The chief functions of this board are to adopt a series of uniform textbooks for the schools of the state; to determine the credentials upon which certificates to teach in the high schools may be issued; to accredit normal schools in other states for teachers' certification; to designate an educational journal for the state; and to grant life diplomas on the recommendation of the County Boards of Education.

For each county there is a County Superintendent of Schools, devoting all of his time to the work, and a County Board of Education. The County Superintendent superintends the schools of his county; is required to visit every school at least once a year; apportions all school money to the districts; passes on all requisitions; conducts an annual teachers' institute; approves all plans for new school buildings; issues temporary certificates to teach; fills all vacancies in boards of district trustees; and makes an annual report to the State Superintendent. Each County Board of Education consists of the County Superintendent as secretary, and 4 others appointed by the Board of County Supervisors, a majority of whom must be experienced teachers. This board is paid $5 per person per day and mileage for its services. It examines all candidates for teachers' certificates; grants certificates to teach to those who are successful, and to those who present proper credentials; adopts rules and regulations and a course of study for the schools of the county; determines what books and apparatus district boards of trustees may purchase, and fixes the prices that may be paid for the same; and examines the schools of the county and issues diplomas of graduation to the pupils.

Cities are governed by Boards of Education, as provided for in their charters, but in other respects are governed by the provisions of the general school law of the state. Each employs a Superintendent of City Schools, as provided for by law, for a 4-year term. For a more detailed statement as to the form of city school government, see special articles on LOS ANGELES, OAKLAND, and SAN FRANCISCO.

School districts, of whatever size, are governed by boards of 3 school trustees, elected by the people of the districts for 3-year terms. The powers of school trustees in districts, and of Boards of Education in cities, are about the same, and include the employment of teachers; the building and repairing of schoolhouses; the preparation of an annual school census; the admission and exclusion of certain children; furnishing free textbooks to indigent children; and making an annual report to the County Superintendent of Schools. Neither board can employ as teachers any one not regularly certificated by the County Board of Education, acting in accordance with the laws of the state. Cities may make their own course of study, may examine and promote their own children, and are exempt from county supervision, but school districts under boards of district trustees do not have such privileges.

Kindergartens, evening schools, high schools, and technical schools are definitely incorporated by the state constitution as a part of the state school system, and provision has recently been made in the law for careful and thorough health supervision, though all of these special advantages are as yet provided only in the larger cities. The school system of the state is essentially a series of county systems, as the County Boards of Education possess large powers, while the State Board of Education and the State Superintendent possess little real power. At the same time the county system is as yet only imperfectly developed, as the school districts still retain large powers.

The publication of school textbooks by the state, which is a feature of the California system, has proved to be a very expensive undertaking, and has never been satisfactory to the schoolmen of the state.

School Support and Expenditure. — The state originally received from Congress for schools the 500,000 acres of land granted to new states, and in 1853 was granted in addition the 16th and the 36th sections, amounting to 6,719,324 acres of land for schools. All of this was devoted to education, but so far has brought in but little to the state, the fund amounting to but $1,737,500 in 1876, and to but $5,314,050 at the time of last report. The large increase in the fund within recent years has been due to the receipt of about one million of dollars from Congress in 1907, in payment of the 5 per cent of sales of public land within the state. The annual state fund for the maintenance of elementary schools within the state comes from the interest on this permanent fund; the proceeds of a general state tax, which must be equal to not less than $7 per census child, 5–17 years of age; about $250,000 received annually from the collateral inheritance taxes; and all poll taxes. All of this must be used only for the payment of teachers' salaries in elementary schools. High schools are maintained out of separate funds, partly derived from local taxation, and partly from an additional state tax, which must be equal in amount to $15 per pupil in average daily attendance in the high schools of the state during the preceding year. About 53 per cent of all school money expended comes from state sources. The elementary school fund is apportioned to the counties on the basis of $250 for every teacher allowed to the districts, towns, and cities by the County Superintendent, and the balance ($10.13 per census child in 1908–1909) on the school census. The high school tax is distributed to the different approved high schools by first dividing ⅓ of the total amount equally among the schools, irrespective of size ($639.90 in 1908–1909), and then the remaining ⅔ of the total on the basis of the number of pupils in average daily attendance in the high schools during the preceding year ($9.37 in 1908–1909).

Each county must also raise, in addition, a county tax for elementary schools of not less than $7 per census child. In making the county apportionment of elementary school funds to the different districts, the California plan is particularly noteworthy in that it ensures a good school in every school district in the state, and in that it favors the small and needy district. The state and the county school money, for elementary schools, are added together, and are then apportioned by the County Superintendent to the cities, towns, and districts on the basis of $550 for every 70 school census children, or fraction thereof of 20 or more (this is called the teacher apportionment); and the remainder is then apportioned to all on the basis of the number of children in average daily attendance during the preceding year. The result of this apportionment plan is that California can pay good salaries to the teachers in all of its schools, has an 8 months' school practically everywhere, and no better rural schools are to be found in any state in the Union. Local taxation is employed for both elementary and high schools to secure any additional funds that may be needed. About 40 per cent of all school money expended comes from state sources, about 55 per cent comes from county taxation, and the remainder from local taxation. There are no township or county permanent school funds in the state, all having been placed in the state fund.

The total expended for all kinds of public schools in 1908–1909 was $15,985,256. Based on the total population of the state this was equal to a per capita expenditure of $8.47 as against $7.49 for the Western Division, and $4.27 for the United States as a whole. The average daily expenditure per pupil was $.303, and the yearly expenditure per pupil in average daily attendance was $54.93, expenditures which were exceeded only by Montana and Nevada. Nevada and Washington alone among the states raise more money ($32.34) per child (5–18 years of age) in the population, but so great is the per capita wealth of California that $.62 from each adult male will produce $1 for each census child, as against an average of $.71 for the Western Division and $1.02 for the United States as a whole. The total expenditures for all purposes are large. Only 60.5 per cent of the total expense is for teachers' salaries, yet salaries in California are comparatively high.

Educational Conditions. — Of the total population of 1900, 24.7 per cent were foreign born, these being distributed widely among the different nationalities. Japanese and Chinese constituted 4 per cent. Of the total population, but 22.8 per cent are children between the ages of 5 and 18 years, California ranking with New England in this respect. By sex, 55.3 per cent are males. Less than 1 per cent of the population are of the colored race, so that the state has no negro problem to deal with. While agriculture is one of the great resources of the state, only 47.6 per cent of the population live in country districts, and 43.8 per cent live in cities of 8000 inhabitants or over.

The average length of term provided was 172 days in elementary schools and 194 days in high schools; the average for all schools was 183 days. Both the percentage of the school population enrolled in the schools (89.68 per cent) and the percentage of attendance based on enrollment (75.43 per cent) are high. This was equal to an average daily attendance of 122.4 days per year for each child between 5 and 18 years of age in the state, and 136.5 days for each child enrolled, as against 76.1 and 109.8 for the United States as a whole. The long term provided is a result of the wise taxation and school apportionment laws of the state, but the attendance is due to the quality of the schools and to the strong sentiment in favor of education which exists among the people, as the state has as yet practically no means of enforcing its compulsory attendance laws. Parental schools are provided for in the laws, but they have as yet been established in only a few cities. The cities generally have local truant officers, and juvenile courts and probation officers exist in a few of the larger cities. The state has a good child-labor law, which is well enforced, the school principals issuing the permits to work, and the inspection of factories and packing establishments being under the charge of the state labor bureau. There is little illiteracy in the state, except among the foreign-born population. The total illiteracy for the state in 1900 was 4.8 per cent, of which 1 per cent was among the native whites (mostly the Spanish and Portuguese elements) and the remainder among the foreign-born whites.

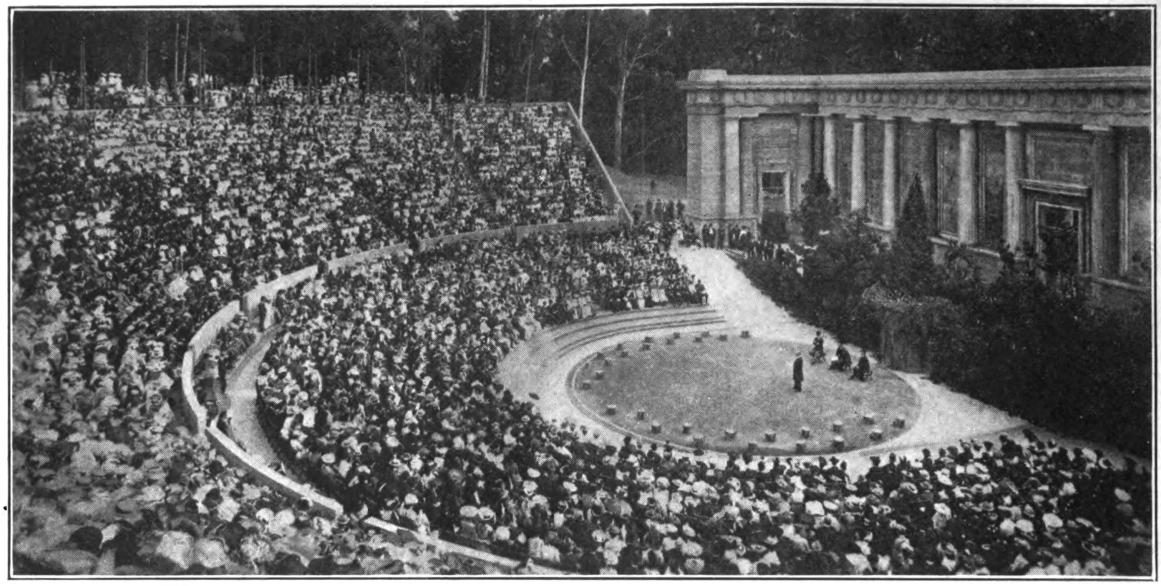
In material conditions the schools make an excellent showing. The school property of the state was estimated as worth about $38,666,761 in 1909, and the estimated average value of the schoolhouses is about $10,000 each. Many of the town elementary school buildings, and nearly all of the high school buildings, are the best of their kind. The rural schools are well graded, and are taught by good teachers. A good school library everywhere is a feature of the California school system. Nature study in some form is taught in nearly all of the schools, agriculture in many of the rural schools, manual training and domestic science in the city schools, and manual training in many of the town schools. Kindergartens and evening schools, and special classes for the instruction of the deaf, are to be found in the cities. Health and development work, under the care of trained men, is to be found in the larger cities. Little has been done as yet toward the consolidation of rural schools, though this has been authorized by law, chiefly because the state has as yet so few people per square mile. All schools of the state are equally open to negro children, though in cities Boards of Education may establish separate schools for Indian and Mongolian children. Under this provision San Francisco maintains separate schools for the Chinese, and has tried to establish them for the Japanese.

Secondary Education. — The State assists in the maintenance of an excellent system of high schools, of which there were 187 entitled to receive aid in 1909. To be entitled to receive state aid a school must have a reasonably good equipment of building, laboratories, and library; must employ at least 2 teachers; must maintain a 4-years' course of instruction, and for at least 9 months; and must have had at least 20 pupils in average daily attendance during the preceding year. Provision has recently been made by law for 2-year and for 6-year high schools. In addition to the public high schools, 49 private high schools and academies are reported, though most of these are small institutions. The universities of the state depend directly upon the high schools, and do not maintain preparatory departments.

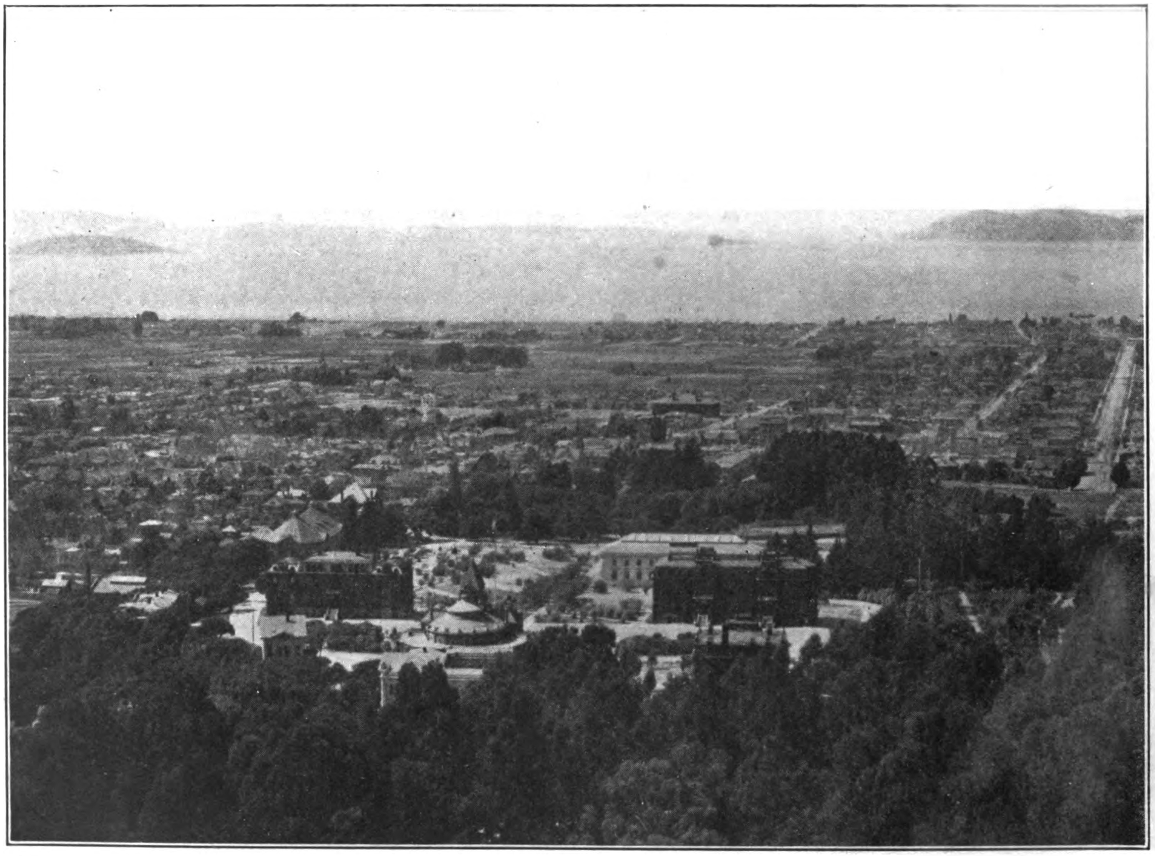
Teachers and Training. — The state employed 10,737 teachers in 1908–1909, of whom about 13.5 per cent were men. Of this number 179 were employed in kindergartens, and 1480 in high schools. The average monthly salary paid to teachers in high schools is about $110, and in elementary schools about $80 per month, for a term of 194 and 172 days respectively.

Of the teachers employed in the elementary schools of the state, 47 per cent are graduates of a California normal school or of some normal school accredited as of equivalent rank, and about 15 per cent of all the teachers employed are graduates of some college or university. Something of the training required of teachers may be ascertained from the requirements for teachers' certificates. For a kindergarten certificate the applicant must have had a high school training, and be, in addition, a graduate of some kindergarten training school. For a grammar grade certificate (the only certificate issued for elementary work) the applicant must be a graduate of a California state normal school, which requires graduation from a 4-years' high school course for admission, and 2 years of training; must possess similar credentials from some accredited normal school elsewhere; or must take an examination lasting 5–6 days, held semi-annually, and embracing all of the elementary school subjects, most of the high school subjects, and professional subjects. For a high school certificate, which is required of all teachers in any kind of a high school, the applicant must be a graduate of a college or university requiring 8 years of high school and college work, and in addition must spend 1 year in graduate work in one of the two large California universities, or in some university elsewhere accredited as of equal rank. For normal graduates and teachers of sufficient experience half of the graduate year is waived. All certificates are valid for 6 years, and credentials of graduation from normal schools and universities, upon which certificates may be granted, are valid until revoked for cause.

For some years the state has maintained 5 normal schools for the training of teachers, located at San Diego, Los Angeles, San José, San Francisco, and Chico; and in 1909 it established a sixth school at Santa Barbara for the training of teachers in manual training and domestic science and art. The state also fully



The Hearst Greek Theater at the University of California.



View of University of California and of Berkeley looking towards the Golden Gate.

accredits the work done in about 60 normal schools located elsewhere in the United States and in Canada. The two large universities act as training schools for high school teachers for the state, though the state also equally accredits the work done in about 20 institutions of high rank in the United States. In the matter of interstate recognition of credentials and certificates, California is one of the most liberal states in the Union, and offers an example to other states well worthy of imitation.

Higher and Technical Education. — The University of California at Berkeley, opened in 1869, stands as the culmination of the public school system of the state. The agricultural and mechanical college, provided for by the Morrill Act, is combined with the state university. The Leland Stanford, Jr., University, located near Palo Alto and opened in 1891, though endowed by private funds, shares the work of higher technical and professional instruction with the state university, and may be classed as a semi-public institution. Besides these two, both of which are coeducational, there are a number of colleges in the state, nearly all denominational, which offer collegiate instruction, as follows: —

College	Location	Control	Opened	For
Univ. of the Pacific . .	San José	Meth.	1851	Both sexes
Santa Clara College .	Santa Clara	R. C.	1851	Men
St. Ignatius College .	San Francisco	R. C.	1855	Men
St. Mary's College .	Oakland	R. C.	1863	Men
St. Vincent's College .	Los Angeles	R. C.	1865	Men
California College .	Oakland	Bapt.	1870	Both sexes
Mills College	Oakland	Non-Sect.	1871	Women
Univ. of So. California	Los Angeles	Meth.	1880	Both sexes
Occidental College .	Los Angeles	Presb.	1888	Both sexes
Pomona College . .	Claremont	Congr.	1888	Both sexes
Throop Polytechnic Inst.	Pasadena	.Non-Sect.	1891	Both sexes

The state also maintains, in addition to the work of the state university, an agricultural and mechanical high school at San Luis Obispo, known as the California Polytechnic School. This institution was established in 1901 " to contribute to the industrial welfare of the State of California." A farm school, connected with the state university, was established in 1906 at Davis, a farm of 700 acres being purchased, with the intention of developing a large agricultural experimental farm and school. The state also maintains the Institution for the Deaf and Dumb, at Berkeley; the Whittier State (reformatory) School, at Whittier; the Preston School of Industry (for boys only; reformatory), at Ione; and the California Home for the Care and Training of Feeble-minded Children, at Eldridge. E. P. C.

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CALIFORNIA, UNIVERSITY OF, BERKELEY, CAL. — A state university forming part of the system of education of the state of California. The university is the outgrowth of two institutions, one the College of California, established in 1855 in a suburb of Oakland, which later received the name of Berkeley, and the other the Agricultural, Mining, and Mechanical Arts College projected by the state in 1866 in accordance with the requirements of the Morrill Act (*q.v.*), and located a little to the north of the College of California. As the result of an agitation to establish an institution of broader scope than the Agricultural College, the College of California in 1867 agreed to cede its property to the state for the foundation of an institution " at least equal to those of eastern colleges and universities." The proposal was accepted, and the legislature passed an act to organize the University of California in 1868 in accordance with the requirements of the constitution. The union of the two institutions thus afforded a means of providing a thorough general education in the humanities, and courses of instruction in accordance with modern professional and industrial needs. The university was opened in 1869, and instruction was given temporarily at Oakland until new buildings were completed in 1873 at Berkeley. No tuition fees were charged, and in 1870 the institution was made coeducational. Professor Durant was the first president, and was succeeded in 1872 by President Daniel Coit Gilman. The maintenance of the university is derived from income from invested funds obtained from the sale of lands, private endowment, and state appropriations of 2 cents on each $100 of taxable property. In 1896 an open competition was announced for plans for a system of buildings to be erected at Berkeley, the cost of which was borne by Mrs. Hearst.

The first prize in the competition was awarded to M. Émile Bénard of Paris, and a beginning was at once made to carry out the plans. The first structure was an open-air Greek Theater, the gift of Mr. W. R. Hearst. Four other buildings were added within the next few years.

The government of the university is in the hands of the Regents of the University of California. The university comprises 10 departments at Berkeley, — colleges of letters, social sciences, natural sciences, commerce, agriculture, mechanics, mining, civil engineering, chemistry, and the first 2 years of a medical department. Five other institutions more or less closely affiliated with the university are located at San Francisco. At Mount Hamilton is situated the Lick Astronomical Department, with the famous Lick Observatory. The university was one of the earliest in the country to introduce in 1884 a system of accrediting high schools, which in 1908 numbered 147. A highly important part of the work of the university is carried on by the Department of University Extension in Agriculture, which assists farmers through visits, bulletins, advice, and instruction. The university has a farm of 775 acres for purposes of experiment in agriculture. In 1908, 70,000,000 pages of literature were published by the agricultural department for the instruction of farmers, and 15,000 personal letters were written in answer to inquiries.

Students are admitted by passing the examination of the university or the College Entrance Examination Board, or on recommendation from an accredited high school. The undergraduate course is divided into lower and upper divisions. A junior certificate is given on the completion of the work of the lower division, after which they continue the work of the upper division over at least 2 years, except in the College of Engineering, which requires 3. A graduate school is maintained granting the higher degrees on the completion of the appropriate courses to candidates who hold the bachelor's degrees. In the year 1908–1909 there were enrolled 3396 students in the university, distributed as follows: letters, sciences, and engineering graduate students, 396; undergraduate, 2680; San Francisco Institute of Art, 139; Hastings College of Law, 100; medical and dental departments, 88; California College of Pharmacy, 67. The officers of instruction and administration in 1908 numbered 525. Benjamin Ide Wheeler, Ph.D., LL.D., is the president.

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CALIGRAPHY. — See Writing.

CALISTHENICS (Gr. κάλλος, beauty + σθένος, strength). — A term originally applied to forms of exercise designed to impart grace of movement and physical strength. This term is now applied to practically all forms of free movements of arms, neck, trunk, and legs, executed with or without hand apparatus. In modern physical education, calisthenic exercises are used to impart not only grace of movement and muscular strength, but also good posture and organic vigor.

These objects are not attained uniformly and in equal proportions from the practice of calisthenics. The specific effects produced are determined by selection of movements and the method of their execution. Grace of movement is secured mainly from rhythmic movements executed to the accompaniment of music; muscular strength is acquired most quickly from vigorous localized contractions of muscular groups against the resistance of antagonistic muscles or weight — either of the body alone or augmented by holding weights in the hands; good posture results from the execution of selected movements with emphasis upon intermediate and terminal positions; organic vigor is gained in greater or less measure from all kinds of body activity — the degree of organic vigor gained being proportional to the number of large muscles brought into play and the quantity of work done.

In Greek physical education calisthenics were practiced in the form of free movements and poses in connection with dancing and singing at the feasts of Apollo. Plato advocated calisthenics in preference to athletic exercises because of their æsthetic value.

Calisthenics, like other kinds of formal physical training, were neglected entirely during the long period between the fall of Athenian education and the beginning of modern physical education in Europe during the latter part of the eighteenth and the opening of the nineteenth century. To Salzmann (*q.v.*), Guts Muths (*q.v.*), and Jahn (*q.v.*) in Germany; Ling (*q.v.*) in Sweden; Amoros in France; and Clias in Switzerland, is due the credit of restoring physical training to a place in educational procedure.

The methods developed by these pioneers were based very largely upon the old Greek exercises and games, such as running, jumping, throwing, riding, and wrestling; they also introduced new forms, such as fencing, dancing, ball games, vaulting, and climbing. Calisthenics occupied a very small place in these early methods of physical training, except in the Swedish system originated by Peter Henry Ling, which accords a prominent place to free movements.

Organized physical training was first introduced in American schools about 1823 by a German, Dr. Follen, who taught jumping, climbing, and gymnastic feats on the horse, parallel and horizontal bars at the Round Hill School, Northampton, Mass. A few schools and colleges followed the example of the Round Hill School, but the interest was of short duration.

The real beginning of the modern physical education movement in the United States occurred in 1848, when a group of German political exiles introduced Jahn gymnastics in a number of colleges. This method consisted in the main of jumping, vaulting, and exercises on the wooden horse, parallel and horizontal bars, usually described as heavy gymnastics. These exercises were suited best to robust young men, and for that reason did not find a place in the schools.

In 1860 Dr. Dioclesian Lewis, a school teacher and physician born in New York State, developed a simple system of calisthenics and opened a gymnasium in Boston.

In August, 1860, Dr. Lewis was invited to explain and illustrate his new system of physical training before the convention of the American Institute of Instruction (*q.v.*) at Boston, Mass. At this meeting attention was drawn to Dr. Lewis' methods, and a committee was appointed to visit his gymnasium. The report of the committee was entirely favorable. Dr. Lewis was also invited to give an illustration of his system before the Institute. A resolution was passed advocating the introduction of his system into general use in schools.

In 1861 Dr. Lewis established the Normal Institute for Physical Education in Newton, Mass. President Cornelius C. Felton, of Harvard College, readily consented to serve as its president, and continued to take an active interest in the enterprise until his death, a year later. The Institute graduated 421 men and women teachers, in about equal numbers, during the 7 years of its existence.

The influence of Dr. Lewis in securing recognition for physical training in the school curriculum is shown in a letter from Weld to Henry Barnard, which was published in the *American Journal of Education* for June, 1865. After giving expression to his changed view regarding the manual labor system, he speaks as follows: "That systematic physical training should be made a part of the daily routine of every school is with me an abiding conviction, and that this should not be made optional, but be made *imperative*. The change in public opinion during the last thirty years is a most hopeful sign of the times. The introduction into hundreds of schools of Dr. Lewis's Light Gymnastics is already achieving large results, and its promise for the future is most auspicious."

During the 30 years following their introduction into public and private schools, calisthenics constituted practically all that was attempted in school physical training. Since the early 90's, physical education has developed very rapidly; trained specialists are employed to teach the subject in nearly all city schools; and gymnasiums are being provided in new school buildings. Calisthenics still occupy a very large place in the physical education curriculum, although other forms of exercise, such as gymnastics on apparatus, athletics (*q.v.*), and dancing (*q.v.*), are now considered essential in any complete scheme of physical education.

G. L. M.

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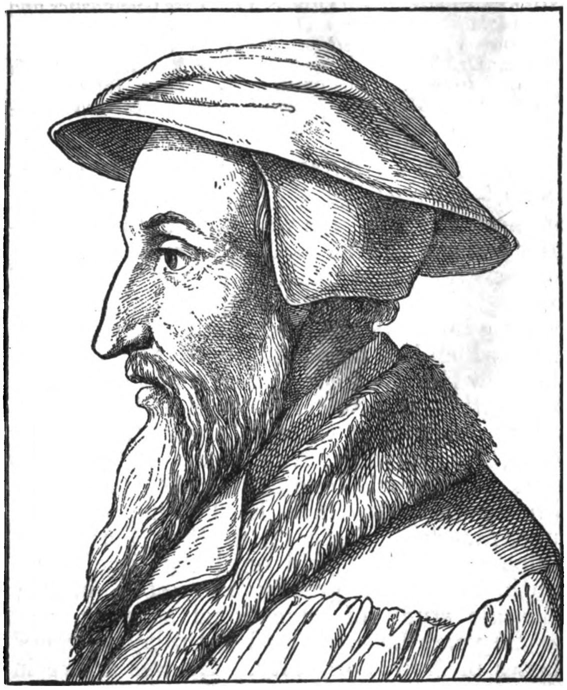
CALKINS, NORMAN ALLISON (1822–1895). — Schoolman, born at Gainesville, N.Y., on Sept. 9, 1822. He was educated in the district schools and at local academies. He was for several years teacher in the schools of Gainesville, and later Superintendent. He became interested in the natural science movement which had been introduced in America by the New Harmony community and the Lyceum Association, and for many years he lectured on object teaching at teachers' institutes in New York, Pennsylvania, New Jersey, and Connecticut, at the same time editing the *Student and Schoolmaster.* In 1862 he became assistant superintendent of schools in New York City, which position he held until the time of his death. He was greatly interested in the scientific study of educational subjects, and for 20 years he conducted Saturday teachers' classes in New York City. He was active in educational associations, and was one of the founders of the N.E.A. Author of *Primary Object Lessons* (1861), *Phonic Charts* (1869), *Manual of Object Teaching* (1881), *From Blackboard to Books* (1883), and (jointly with Henry Kiddle and Thomas F. Harrison) *How to Teach.* He died in New York City, Dec. 22, 1895.

W. S. M.

CALVERT HALL COLLEGE, BALTIMORE, MD. — See Christian Brothers, Schools of the.

CALVIN, JOHN (1509–1564). — Although he called himself "a man of the people," Calvin shared in the home life of the noble family of Hangest, with whose children he attended school at Noyon and the University of Paris. His father, who had married into one of the best burgher families of Noyon, devoted his income from lucrative positions of trust in church and commune to the education of his sons. At 14 Calvin came under the sound grammatical training of Cordier (*q.v.*).. After his course in arts (chiefly at the college of Erasmus and Loyola), he took his degree in law after 3 years at Orleans and Bourges under de l'Estoile and Alciati (*q.v.*), meanwhile studying Greek with Wolmar. His father's death left him free to follow his preference for humanistic studies. His first book, a commentary on Seneca's *De Clementia,* displayed keen interest in morals and classics. In 1532 or 1533, through God's "secret providence," Calvin experienced "a sudden conversion," "received some taste and knowledge of true piety," and turned to the study of theology. When barely 26 he completed his *Institutio Christianae Religionis,* thenceforth the textbook of Protestant theology and arsenal for opponents of loose discipline or arbitrary government. His fundamental premises from which all his teachings sprang were the absolute sovereignty of God and the authority of his "Word." A brilliant and laborious student, winning distinction in debate and lecture room in the university, he early acquired habits of labor at Paris, where he was bred to 11 hours of school work, and at Orleans, where after a light supper he studied until midnight, waking early to think over what he had learned the previous day. Genius and incessant labor enabled him to accomplish a prodigious amount of statecraft and writing, his printed *Opera* filling 59 quarto volumes. Calvin and his followers had no sympathy for "idle bellies who chirp sweetly in the shade."



John Calvin (1509–1569).

Obedient to "the calling laid upon him by God," he twice abandoned scholarly life to remodel Protestant but unreformed Geneva. The *Articles* of 1537 submitted by Farel and Calvin to the magistrates outline the statesmanlike program of a reformer working on long lines. The "Word of God" rather than the canon law should be observed. The Church has a right to scriptural creed, worship, and its own organization, involving discipline and excommunication. Children must be carefully trained "to give a reason for their faith" and pass an examination on a catechism. Calvin's French catechism (1537), briefly restating the teaching of the *Institutes,* formed the basis of the Sunday noon catechism which every child must attend punctually under civil penalties imposed upon parents, who were also obliged to train their children at home. Revised (1542) in the form of question and answer, it went through 70 editions in nearly all languages of Europe (14 in English) before 1630, and was among the four, one of which was required of all Oxford undergraduates in 1578. The children were trained in singing the psalms an hour daily in school, that under their lead the whole congregation might learn to "lift their hearts to God." Calvin's successful insistence upon trained congregational singing, his use of stirring melodies, and the translation of psalms by himself, Beza (*q.v.*), and Marot introduced an invaluable democratic and emotional element into public worship. On Jan. 12, 1538 (before Sturm's Strassburg program), Calvin, Cordier, and Saunier published a prospectus of the Genevan elementary schools, marked by three progressive features: careful grammatical drill before rhetorical display; a substantial place for teaching the vernacular and practical arithmetic; training for civil as well as ecclesiastical leadership. The principle that "the liberal arts and good training are aids to a full knowledge of the Word," reasserted in Calvin's *Ecclesiastical Ordinances* adopted by Geneva in 1541, necessitated instruction in "languages and humane sciences" and "the organization of a college for instructing the children to prepare them for both the ministry and civil government." Education was a logical necessity for both layman and minister in Calvin's Biblical Commonwealth, and Calvin was both teacher and pastor. He began his work at Geneva as "Professor of Sacred Letters," lectured in theology throughout his ministry, sometimes to an audience of a thousand (*Opera,* XIX, 20), and worked out his programs of 1538 and 1541 into a unified system of primary, secondary, and university education through the *Collège* and University (*Académie*) established in 1559, which served as a training school and model for Protestants, and whose laws, as Richer and Kampschulte have shown, were utilized by the Jesuits in their *Ratio Studiorum.* The strenuous moral training of the Genevese and the peoples who studied Calvin's *Institutes* and his

Genevan institutions was an essential part of Calvin's work as an educator. All were trained to respect and obey laws based upon Scripture, but enacted and enforced by representatives of the people, without respect of persons. How fully the training of children, not merely in sound learning and doctrine, but also in manners, "good morals," and common sense was carried out is pictured in the delightfully human *Colloquies* of Cordier, Calvin's old teacher, whom he twice established at Geneva.

Luminous and majestic in his theology, convincing in his reasoning, if we grant his premises, Calvin was far more than a theologian. Even the *Institutes*, especially in the remarkable book on civil government, suggest the wide range of his activity. Calvin's memorials to the Genevan magistrates, his drafts for civil law and municipal administration, his correspondence with reformers and statesmen, his epoch-making defense of interest taking, his growing tendency toward civil, religious, and economic liberty, his development of primary and university education, his intimate knowledge of the dialect and ways of thought of the common people of Geneva, and his broad understanding of European princes, diplomats, and politics mark him out as a great political, economic, and educational as well as a religious reformer, a constructive social genius capable of reorganizing and molding the whole life of a people. He had the intense aggressiveness of the unflinching reformer. Though he won the undying affection of those who really knew him, his temperament was essentially masculine, and there was a lack of sentiment, humor, and those gentler qualities which win the affections of the world. In St. Peter's and the consistory, in the city hall and the streets of Geneva, he was the terror of evil-doers and heretics, the prophet of righteousness, with a majesty of conviction and a clearness of sound reasoning which convinced magistrate and common man, and won their awe and admiration, if not their affection. However men may differ in their estimates of the theology and personality of John Calvin, the outstanding facts regarding his historic work are not its narrowness, but its breadth of range and its fecundity of influence in two continents. H. D. F.

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CALVINISTS AND EDUCATION. — One of the fairest and most permanent influences of Calvinists in Geneva, France, Holland, Scotland, England, and America was their contribution to education. Calvin and his followers emphasized intellect and will more than feeling in the religious and moral life.

1. Calvin's *Institutes* taught that "God has furnished the soul of man with a mind capable of discerning good from evil and just from unjust; and of discovering, therefore, by the light of reason what ought to be pursued or avoided. . . . To this he has annexed the will" (I, xv, 8). Reason, "being a natural talent, could not be totally destroyed but is partly debilitated," and "smothered by ignorance." Yet "not only the Divine Word but also the experience of common sense" enables us to "perceive in the mind of man some desire of investigating truth." The capacity for such investigation was especially strong in "civil polity, domestic economy, all the mechanical arts and liberal sciences." (II, ii, 12, 13). Calvin in his interpretation of "the Word of God" did not hesitate to appeal to reason and equity. In his epoch-making refutation of the Mosaic prohibition of interest, he held that "the law of Moses (Deut. xxiii, 19) is political, and constrains us no further than is demanded by equity and human reason" (*Opera*, X, 246). Calvin did more than make the appeal to reason; his *Institutes* and catechism are marvellously cogent pieces of reasoning which taught the Protestants of western Europe and the colonists of America to test and revise Calvin's own premises in the effort toward a larger freedom of thought than he dreamed of. "Although we yield the first place to the Word of God, we do not reject good training . . . the Word of God indeed is the foundation of all learning, but the liberal arts are aids to the full knowledge of the Word and not to be despised." With these premises, viz.: the light of reason, man's desire and capacity for investigating truth, the need of training and the arts to understand the Word and the fundamental authority of that Word, the Calvinist, with his logical temper, saw that learning was not merely possible and desirable as "an ornament and no small private gain," but also

a public necessity in order to secure " political administration, sustain the church unharmed, and maintain humanity among men." The quotations in the two preceding sentences, taken from the school program drawn up for Geneva by Calvin, Cordier (*q.v.*), and Saunier in 1538, are typical of the aims and reasoning of the Calvinist. This education was moreover for laymen as well as for ministers. Calvinism with its teaching of the political rights and duties of " popular magistrates " appealed to peoples who believed in representative government. Its emphasis of the rights of laymen in the Church, and its systematic provision for the exercise of these rights through local consistory or kirk session, provincial synod and national assembly, not only trained James I's " Jack and Tom, and Will, and Dick," Mornay, Aldegonde, or William the Silent, in the exercise of judicial and legislative and administrative functions, but also showed them the need of education in order to train up an intelligent laity to serve in " church and commonwealth."

2. Added to his intellectual love of premise and conclusion, the Calvinist developed a strength of will, moral intensity, and practical temper which compelled him to put principle into practice, to enforce his ideals upon himself and others and embody them in concrete working institutions. " It is stupid to feel in one's self the capacity to do something well and not to seek out the means of doing it," wrote Mornay, leader of the Huguenots, counselor of Henry IV, and founder of the University of Saumur. " We dar and will," was the spirit of Melville, reorganizer of Glasgow and St. Andrews Universities. " One of the next things we longed for *and looked after* was to advance learning and perpetuate it to posterity," wrote one of those Puritans who were the founders of Harvard and the New England common schools. Not to be content to feel or long for things, but to dare, to will, to seek out, to look after things, these were characteristics of the Calvinists which impelled them to found school and college.

3. The funds for maintaining education were forthcoming through a productive economic policy and habit of giving based on a sense of social obligation. " He who will not work shall not eat " was the motto of Geneva and of Calvinists of all lands. Six days of productive labor was quite as much a part of the Fourth Commandment, according to the Calvinist, as resting on the seventh. His catechism taught the Calvinist that one object of Sunday rest was " to get men into the habit of working the rest of the time " (*Opera*, XXII, 41).

God himself, according to the Calvinistic teaching of Providence, is " not idle and almost asleep, but vigilant, efficacious, operative and engaged in continual action " (*Inst.* I, xvi, 3). " Christianity is a busy trade, the estate of a Christian is a working estate," wrote the Puritan Sibbes, widely read and honored in old and New England, whose books went from John Harvard to the founding of Harvard College. In Geneva, " every one was obliged to work without observing holidays, save on Sunday." In England, Christopher Goodman and Robert Fills, former exiles in Geneva, the authors of the *Admonition to Parliament*, William Crawshaw of the Virginia Company (1609), Cromwell's Major-Generals, and in Plymouth Governor Bradford illustrate the Puritan objection to idleness on both scriptural and economic grounds. Baird has shown that the Huguenot's non-observance of ecclesiastical holidays gave him an advantage of about one day a week over his Catholic neighbor. " Some handycraft," " some trade," " some verteouse industrie," " learning and labor," " idleness and lack of education," — these phrases from the records of school legislation among Scotch, Huguenots, and New England Puritans suggest the close relation between education and industry which lay in the minds and the policy of Calvinists. The teaching of the lawfulness of interest spread by Calvin, Francis Junius of Leyden, William Perkins of England, James Spottiswoode of Scotland, and Salmasius, Huguenot teacher of Leyden, and by Huguenot synods, gave Dutch, Huguenots, Scotch, English, and American colonists a great advantage over peoples who still clung to the canon law prohibition of interest. The Calvinist's firm belief in Providence increased his economic efficiency, because it lessened his worry about his future, which lay in God's hands, and increased his devotion to his daily task, his " calling," which equally with his future life was a part of God's plan.

4. With thrift and " gainful occupations " the Calvinist combined to a remarkable degree the habit of generous giving. Fortunately these men who acquired and had enough to give had also the sense of social obligation. Genevan, Scotch, and English Calvinist offered this " Prayer to be said before a man begin his work " : " Strengthen us with thy Holy Spirit that we may faithfully travail in our state and vocation without fraud or deceit. . . . And if it please Thee, O Lord, to prosper our labor, give us a mind to help them that have need, according to that ability that Thou of Thy mercy shalt give us." Knit together by the common allegiance to the higher law of the Word of God to which high and low were alike subject, loyal to this Word of their " Commander-in-Chief," " before whose royal sceptre every head must bow and every knee must bend," facing common dangers, yielding common subjection to the moral discipline exercised by their own chosen representatives, acknowledging daily to Divine Providence their common responsibilities as His instruments and as children of one Father, the citizen soldiers of the Calvinistic commonwealth, the Puritan State, had a compelling sense of corporate unity and responsibility. " I am master,"

wrote Calvin in his discussion of freeing servants, "but not tyrant; I am master, but it is on this condition that I be also brother; I am master, but there is a common master in heaven both for me and for those who are subject to me: we are all here like one family" (Comm. on Deut. xv, 12, in *Opera*, XXVII, 351). "This world," said Paul Baynes, Calvin's influential Puritan follower in the next century, "is a piece of God's household." Such a commonwealth, bred on such teaching, logically demanded compulsory common schools so that "neathir the sonis of the riche, nor yit the sonis of the poore, may be permittid to reject learnyng; but must be chargeit to continew thair studie, sa that the Commoun-wealthe may have some confort by them" (*Buke of Discipline*, Knox, *Works*, II, 211). Such a social sense illuminates the records of the Genevan councils and consistory, the synods of the Huguenots of France and their friendly societies in London, Dublin, and Charleston, the Kirk Sessions, presbyteries, general assemblies, and the burghs of Scotland, the New England towns, churches, general courts, and "the Commissioners of the United Colonies of New England," with a story of systematic and self-sacrificing provision for better social conditions, improvement of health and morals, care of the sick in hospitals, fire protection, sewage, and notably for diffusion of knowledge and the training of youth in "knowledge of God and his ways" and in "gainful occupations." Intellectual liberty and freedom of inquiry were not the chief aims of the Genevan reformers or their Puritan followers, but they were the priceless by-products of what may be called in the larger sense of the word the Puritan commonwealths of England, Scotland, Holland, the American colonies, and of the attempted Puritan republic in France.

5. However intolerant toward what he believed error, the Calvinist was "not fearful of Knowledge." He felt rather that "the fearful estate is to flee from Knowledge." Therefore he "did not mislike all new inventions nor suspect all new discoveries and hold that whatever is new is nought." Such was the attitude of the Puritan minister, William Crawshaw in a sermon to his fellow members of the Virginia Company of London. Another Puritan minister, Paul Baynes, who influenced the New England clergy both directly and through Sibbes and Cotton, wrote in a book owned by Elder Brewster: "God hath not stinted us to any certain degree of knowledge but would have us seeke to be filled with all knowledge and wisdom." "Truth is strong next to the Almighty: she needs no policies, nor stratagems nor licensings to make her victorious" was the fine defense of the liberty of the press by the Puritan poet in politics. Most appropriately did the first two New England universities take truth as their motto, Harvard with its *Veritas*, Yale with its *Lux et veritas*. "Vigorous free thought" was stimulated by the appeal to reason and the consequent "desire to investigate truth." It was applied and tested because of a strong will, moral sense, and practical bent. It was possible to "advance it and perpetuate it to posterity," because of the social insight which founded and the economic productiveness which maintained the college and common school.

As one follows the writings, statutes, and practices of the Genevans, Dutch, Huguenots, and the Scotch, English, and American Puritans, it becomes clear that in their educational system they had a common method and aim, and a common motive power behind these. Furthermore, it is clear that these methods, aims, and motives were developed through a remarkable international exchange of ideas through books and teachers. The common aim of training men for both civil and religious service, for "church and commonwealth," is recorded repeatedly in the enactments of all these Calvinistic peoples. Bourchenin has shown that 40 Scotch teachers taught in the Huguenot institutions; while the men trained in the University of Geneva who went forth to teach and preach are numbered by the hundreds rather than by the scores. The distribution of Calvinistic books was remarkable. Of Calvin's *Institutes* 74 full editions and 14 abbreviated editions had been published before the Puritan exodus to New England in 1630; and by the same date 77 editions of his catechism. Each of these works was printed in 9 languages by 1630. His catechism was adopted by the Scotch, Huguenot, French-Swiss, and Walloon churches, and accepted and widely used in Holland, England, and America. The scholarly editors of the standard *Opera* noted 394 titles of works by Calvin published by 1618. Even this is incomplete. An examination of the Stationers' Registers and of Dibdin reveals in the sixteenth century alone not less than 41 additional titles not included by Calvin's editors. Of Beza's Latin text of the New Testament no fewer than a hundred editions are said to have been published. Of Beza and Marot's translation of the Psalms, at least 25 editions were published the first year and more than 60 in the first 4 years, 1561–1565. Nearly a score of writers who had shared in the reform at Geneva or come under the influence of its leaders are to be found in one or more of the seven early American libraries of Harvard, Winthrop, Bellingham, Brewster, Rev. John Goodborne, and the Virginia Company of London and the "provincial library" of Edenton, N.C. To the influence of Huguenot writers upon English thought Sidney Lee in his recent Oxford lectures has called attention. The influence of this intellectual network of Calvinistic men and books upon the teaching and thinking of the sixteenth and seventeenth centuries is enormous.

England. — The educational activity of the

English Puritans manifested itself in the founding of colleges and the control of the teaching of the universities. Of the founding of Emmanuel College, Cambridge, 1584, the Puritan oak that grew from Walter Mildmay's acorn, Fuller wrote, " Sure I am at this day it hath overshadowed all the University, — more than a moiety of the present Masters of Colleges being therein." From this college manned by the most rigorous Calvinistic thinkers in England came about 50 of the first generation of New England clergymen. Puritans from Emmanuel and from Scotland, friends and probably pupils of Andrew Melville, the Scotch reformer trained in Geneva, founded and manned Trinity College, Dublin, which for the first generation, 1591–1630, remained a stronghold of Puritanism and gave to the Church of Ireland a strong and lasting Calvinistic character.

On the university and intellectual life of England a strong influence was exerted through exiles, students, and professors from Geneva, and through the voluminous writings of Calvin, Beza, and their Huguenot and Dutch followers like Mornay, Hotman, Chevallier, Scaliger (*q.v.*), and Isaac Casaubon (*q.v.*). Of the exiles at Geneva some gave England the Genevan version of the Bible, the version which Carter has shown was used by Shakespeare, and which was the popular edition up to the Puritan exodus to New England, over 100 editions being issued 1560–1617. Four exiles became heads of colleges, and two were professors of divinity at Oxford and Cambridge. Thomas Bodley, son of the printer of the Genevan version and student under Calvin and Beza, founded the Bodleian (*q.v.*), said to have been the first practically public library in Europe. One hundred and thirty-four of Calvin's writings were issued in English alone in the last half of the sixteenth century by 52 English publishers, no fewer than 40 in London. Of Beza's works at least 110 were issued in English or in England and Scotland by 1611; and on his Latin text of the New Testament the Genevan version in English was largely based. Calvin's *Institutes* continued to be the ordinary book of divinity for theological students, both Anglican and Puritan, well into the seventeenth century, as was testified by Sanderson, Charles I's chaplain and the nominee of Laud. Archbishop Laud studied it as an undergraduate at Oxford, and as late as 1636 felt it necessary to complain to the Bishop of Winchester that " the probationer fellows at New College were examined how diligently they had read Calvin's *Institutes*." Moreover for over 50 years (1575–1604, 1611–1633), whatever may be held as to the exact amount of Calvinism in the Thirty-nine Articles, the sympathies of the primates of the English church, Grindal, Whitgift, and Abbot, were with "the Calvinistic theology" (Gardiner; cf. Creighton on Grindal, *Dict. Nat. Biog.*). In the controversies of the sixteenth and seventeenth centuries, Anglican as well as Puritan, Whitgift and Hooker, as well as Cartwright and Travers, quoted Calvin's theology with approval. It was over the questions of discipline and worship that Anglican and Puritan differed. The remarkable predominance of Calvinistic and Genevan books in England is indicated in the Stationers' Registers for the sixteenth century and in the list of early gifts to the Bodleian (1600–1610), the printed catalogue of the Bodleian for 1605 and of Magdalen College, Oxford, for 1611, the catalogue "of approved divinity books" for 1655 and 1657, and of " the most readable books in England " for 1657 and 1658. By vote of the University of Oxford in 1578, Calvin's *Catechism* and *Institutes* were included in the list of books which had to be studied by all undergraduates. The conclusions of Gardiner and Sidney Lee that the Calvinistic theology was dominant not only in Cambridge, but also in Oxford, in the closing years of Elizabeth's reign is corroborated by the books owned or prescribed by the university, and by the views of the professors of divinity or heads of colleges. So far as its theological thinking was concerned, Oxford was in line with Cambridge, Heidelberg, Trinity College, Dublin, and the Scotch, Dutch, and Huguenot universities well into the seventeenth century.

Palatinate. — The University of Heidelberg became a strong Calvinistic center in the Rhine region under the teaching of Tremellius, Olevianus, Ursinus, Pareus, all of whom had come into personal relations with Calvin at Geneva, and all of whom published translations or defenses of Calvin's writings. Of the writings of these four Heidelberg Calvinistic teachers there are at least 14 in the Bodleian Library catalogue in 1605; 12 were in the libraries of Elder Brewster, Governor Bellingham of Massachusetts, Rev. John Goodborne in Virginia, and the library of Harvard College at its founding. English and New England Puritans preserved also books about the Palatinate, and evinced keen interest in its fortunes.

Holland. — The universities of Leyden, founded by William of Orange, 1575, Groningen (1614), Utrecht (1636), Amsterdam (1630), and 10 other universities or higher institutions of learning in the century following Leyden had an international reputation, maintaining close relations with Geneva, France, and England, through teachers like Scaliger and Junius Brutus, who had been at Geneva, or Salmasius, a Huguenot. Of the list of famous men of Leyden, published in 1625, more than one fourth had been students in the University of Geneva.

Popular education was cared for by both Church and State. The Synod of Dort resolved that " Schools in which the young shall be properly instructed in piety and fundamentals of Christian doctrine shall be instituted not only in cities, but also in towns and country places where heretofore none have existed. The Christian magistracy shall be requested that honorable stipends be provided for teachers, and that well-qualified persons may be employed and enabled to devote themselves to that function; and especially that the children of the poor may be gratuitously instructed by them and not be excluded from the benefits of the schools." (*Sess.* XVII, Nov. 30, 1618.) The Synod also directed the pastors to exercise careful supervision of schools by frequent visits, encouragement and examination of religious instruction, advice to teachers, and report of failures in their duties to magistrates. Drenthe (1630) ordered that for all children over 7 years, whether attending school or not, a school tax should be paid, and later endeavored by withholding of poor relief to stimulate school attendance. Overyssel (1666) had an obligatory school tax for children between 8 and 12. Amsterdam and many other cities demanded an examination of teachers; and Groningen required the pastors to bring the children to school. Provision for free education of poor became general, sometimes by special schools for the poor, at the beginning of seventeenth century. The Dutch, with their native intelligence and thrift stimulated under Calvinistic ideas and directed under Calvinistic leadership, in the sixteenth and seventeenth centuries founded noted universities, and made elementary education accessible to the poor as well as to the rich.

The Reformed Church of Holland sent ministers not only to the Dutch Reformed Church in America, but also to the German Reformed Church in the United States, made up largely of refugees from the Palatinate; and for the Germans in the United States it " raised nearly $60,000 for the erection of churches and schoolhouses and the support of ministers." (See HOLLAND, EDUCATION IN.)

Scotland. — The history of the influence of Calvinism in Scotch education is so nearly identical with the educational history of Scotland from the time of the Reformation that only a general summary need here be given. For a detailed treatment the reader is referred to the article, SCOTLAND, EDUCATION IN.

On Knox's return from Geneva to Scotland he and his colleagues incorporated in the first great nationalized epitome of Calvinism, *The Buke of Discipline* (1560), a plan for a comprehensive national system of compulsory education.

The scheme for compulsory national education could not be carried out in its entirety, because of lack of funds. Yet the records of the Calvinistic church and commonwealth show a notable development of general education in the sixteenth and seventeenth centuries. (1) The Church laid down a program, giving reasons and methods for the compulsory education of rich and poor alike. (2) The acts of general assembly, synods, presbyteries, kirk sessions, and of the national Parliament show that the Church exercised supervision over schoolmasters, scholars, and schools. (3) "The ecclesiastical records abound with acts of charity toward the sustentation of the ill-paid master and the free education of poor scholars " (Grant, *History of the Burgh Schools of Scotland*). (4) The Church not only gave money itself, but stirred up its various bodies to incite Crown, Parliament, and town councils to restore or apply old funds, or to create new ones for schools.

In 1641 the General Assembly requested Parliament to establish a school for instruction in reading, writing, and the rudiments of religion in every parish, and a grammar school in every considerable place including all presbyterial seats. The assembly also appealed to Parliament for support of the poor in school; and it directed all ministers to report to their presbytery whether a school existed in his parish. Five years later Parliament enacted that the heritors of every parish lacking a school should provide a schoolhouse and a stipend for the master, or it would be done by 12 men nominated by the presbytery with power to tax the heritors. In 1696 Parliament ordered that schools be established and that landlords should build schools and master's house and provide his salary, the pupils paying a small fee. The minister and landlord were to appoint the teacher and determine the fees, while supervision was left to the presbyteries, which could censure and dismiss schoolmasters, subject, however, to the control of the synod. Through the persistent efforts of ministers, assemblies, synods, kirk sessions, town councils, and Parliament, there was gradually worked out in Scotland in the sixteenth and seventeenth centuries a system of education which was religious, democratic, making education necessary and possible for rich and poor alike, from elementary school to university, and probably as near to deserving to be called national as any system of the same period in an equal area.

France. — The Huguenot educational institutions grew out of (1) the logical need of " those of the religion " for institutions to give moral and intellectual training to both laymen and clergymen; (2) the Calvinistic spirit of putting principles into practice at any cost; (3) the carefully knit organizations of the reformed churches of France; (4) the existing model at Geneva.

Coligny founded and maintained a college at Chatillon (1560) because he believed that " ignorance of letters has plunged the republic and the church into thick darkness," and that education was a " singular gift of God." " In order that the youth of our land may be better instructed that they may be able to serve the public better," the Queen of Navarre founded the *Académie* of Orthez " to teach letters, good morals, and discipline to the children " (1566). " To preserve learning, the sure and certain foundation of the true religion," and to " advance the public good " were the motives for the founding of the *Académie* at Sedan urged upon the Duke of Bouillon by his Huguenot mother. So the church synods established schools not only " that our churches may be always furnished with a sufficient number of pastors," but also that they should have " other persons fit to govern them," *i.e.* laymen. The laymen, who regularly formed a majority of consistory and sometimes of the synods (never being in a minority), necessitated a high standard of lay education. " The Huguenots will be instructed," wrote the Catholic Marquis d'Aguessau, governor of Languedoc; " it is certain that one of the things which hold them to their religion is the amount of information they receive from their instructors." Even a common Huguenot sailor like Taré Chaillaud thought it folly to " believe everything which the church says without informing yourself of other things through conscience." The national synod of 1612 petitioned their majesties " to grant leave unto us, in all cities and towns where there be a number of families of our Religion, to keep lesser schools for the education of our children . . . this being a matter which can never be dismembered nor severed from our liberty of conscience." " Universities and colleges are the workshops where the spirits of men are formed and fashioned, the springs and fountains of power, discipline, and art " (Laws of Montauban, 1600). " Virtue and learning are the seeds and the fruits of universities; the university is the nursery of future members of society " (Laws of the University of Nîmes, 1582). " I desire to excite myself to the love of virtue and the hatred of vice, and to aid the studious youth in the same endeavor, an object which has been too little regarded by former commentators," declared Isaac Casaubon (*q.v.*), child of Geneva and Professor at Montpellier. The charmingly human and naïve " little grammarians " of Cordier's *Colloquies* show how the boys were taught to think and practice a sound morality of boyhood, and to prize " virtue and the knowledge of honest things." The boy unfit for scholarship was recommended " to learn some trade suitable to his capacity " (32d Colloquy). Such expressions of founders, rectors, professors, and pupils reveal the purpose to give both elementary and university training not merely to clergymen, but also to laymen, so that all might be brought up in sound morality as well as sound learning to serve " the republic and the church." The education of Huguenots was not merely ecclesiastical, but civil; not only intellectual, but also moral and economic.

The Calvinistic spirit of putting principle into practice, of turning principles and possibilities into actualities, enabled the Huguenots to carry out their educational ideals at the cost of great sacrifices on the part of municipalities, churches, individual founders, and ill-paid rectors and professors. The Calvinistic genius for organization furnished effective channels for founding, maintaining, and supervising education, through the consistory of the local church, colloquies of neighboring churches, and the lay and ministerial deputies gathered in provincial and national synods. Elementary schools, teaching reading, writing, the catechism, and elements of arithmetic founded and supported by local consistory or Huguenot nobles were numerous, usually one for each church and evidently sometimes more, for the decree of 1671 restricted the reformed to one school in each place where their public worship was tolerated. Even the lower classes came to have an astonishing knowledge of Scripture.

Careful provision was made for the education of the poor. " In every colloquy one poor scholar at the least was to be maintained . . . in the Universities, and rather than this design should miscarry, the fifth penny of all our charities shall be set apart . . . to be employed in this service," was the provision of the Huguenot Discipline. Each colloquy was obliged to report on this matter " unto their provincial synod, and the provincial synods shall give an account thereof unto the National " (Synod, 1594). Scholarships for poor scholars were also established by individuals who usually entrusted the administration to the local consistory. Each province was " to do its utmost that a college be erected in each of them " (Synod, 1596). This provision was so well carried out that in each of the 15 provinces, with the possible exception of Provence, one or more colleges were founded by municipality, nobles, or princes or churches, and supported by endowment, tuition fees, and subsidies from the national or provincial synods, the " helping hand " of colloquies, or grants from consistory. Thirty-two of these Huguenot colleges were in operation between the reform and the Revocation of 1685 (Bourchenin, 66 ff.). The National synods also urged the founding of *Académies* or universities, and granted funds for their support. Eight of these Huguenot universities, with degree granting powers, were established between 1561 and 1604; by consistory at Nîmes and Montpellier; by the local church and the provincial synod of Dauphiné at Die; by national synod at Montauban; by joint actions of Duplessis Mornay and the national synod at Saumur; by the Queen of Navarre at Orthez, erected into a royal university by her son Henry IV; at Orange by Louis of Nassau, who had come under the influence of Calvin and Beza at Geneva; by the Duke of Bouillon at Sedan. These universities (save Orthez and Orange, which were outside the kingdom) received moneys and laws from the national synod.

The businesslike quality of the Huguenot is seen in the handling of the funds. Each provincial synod had to account to the national synod for subsidies for universities and colleges. A province or university tardy in its accounts had its award delayed for satisfactory accounting and auditing. Each of the synods from 1598 to 1644 appropriated from 3000 to 16,000 livres to the universities, the amount from 1607 not falling below 12,000 livres (Tables in Bourchenin, 302–303). " Scholars received by the Provinces as pensioners shall give in good security for repaying the sums received by them . . . in case that through their default they do not serve the church in the ministry of the Gospel" (Synod, 1607).

The university councils " were to see that the synod's laws were obeyed " and " that the scholars do carry themselves with all modesty." In order that " the said statutes may be better observed," the national synod directed the provincial synods to depute annually two pastors to inspect the universities " and make enquiry whether the professors and scholars both of them do faithfully and diligently intend and mind their duties." The finding of these inspectors was to be reported by provincial deputies to the national synod (Synod, 1617). " These inspectors," says Loret (*Rev. Franc.* 1856, Vol. VI, p. 404), " are proof of a remarkable organization and direction of the divers reformed institutions, not to be found in the Catholic universities, either Jesuit or others." While there was in all the Huguenot universities and colleges the same spirit, there was also, as Bourchenin has shown, a large amount of initiative and spontaneity in each college.

The acts of synods show that the measures for the education of the poor were well carried out. Education, as in Geneva, Holland, and Scotland, was for all classes, poor and rich alike. Casaubon was struck in England by the absence of " what we call poor scholars." Equality of subjection to law was maintained for both professor and scholar, both of whom were subject to the annual inspection. Cordier's *Colloquies* suggest wholesome relations between master and pupils, with a simple sort of self-government among monitors and boys who are taught to avoid tale-bearing and to distinguish between serious faults and little things honestly repented. According to Cordier, even in choice of monitors the opinion of " the better pupils " was consulted. The discipline was careful and rigorous, and much attention was paid to both manners and morals, but apparently the regulations were tempered with some humor and common sense. To the English observer, Quick, the boys seemed to be too little restricted and on too familiar terms with teachers. Pupils lived not in an *internat*, but in homes, often of regents or professors in the city. They were taught reverence for parents, and fathers were corresponded with as to their sons' welfare. Neglectful students were dropped and posted. From Geneva they adopted the idea of censures at the close of daily session, and the annual examination for promotion at end of year. Some attention was paid to music, and pupils were taught the words and music of Marot and Beza's translation of the Psalms. Cordier's *Colloquies* indicate that there was some regard for exercise and relaxation, but the provision seems to have been less systematic than with the Jesuits. There was more emphasis on the vernacular, arithmetic, and Greek, and less prescription of Latin to the exclusion of French than in the schools of Sturm and the Jesuits. " M. Nisard says that after the definitive triumph of catholicism in France, Greek became offensive as the language of heresy. This is perhaps to say too much. But it is certainly true that more strenuous efforts were made at this moment to keep up Greek and Hebrew in the Protestant Academies, poor as they were, than in the Catholic and Jesuit Colleges and Universities" (Pattison, *Casaubon*, p. 113). Huguenot colleges and universities, says Bourchenin, put texts more fully into pupils' hands, discussed context and history more fully, and developed the spirit of inquiry and investigation more than did the Jesuits. This spirit of inquiry, so essential a characteristic of Calvinism, subjected Calvinistic theology to reëxamination and restatement after conflicts. It also gave a larger element of spontaneity and progress to Huguenot institutions.

The universities were urged " to do their utmost in getting a public library," and the churches to " get libraries for the service of their ministry." The synods followed up their recommendations, and all the universities secured libraries. The library at Die was created by the Academic Council through gifts from notables, synod, and candidates for degrees; at Nîmes by the consistory; at Sedan by a fund established by the university, supplemented by Henry of Bouillon; at Saumur by Duplessis Mornay's gift of his library. Sedan and Samur had collections of European reputation.

At the opening of the seventeenth century the Huguenot universities, according to the testimony of the Catholic historian, de la Fond, " held their place among the most learned of Europe" (*Essai sur Loudun*, 93). The long list of famous teachers reveals the international character of Calvinistic teaching: Gomar of Leyden, later the opponent of Arminius, was called to Saumur, 1614; John Robert Chouet of Geneva, an admirer of Bacon and a follower of experimental research, the first to teach the philosophy of Descartes in the Huguenot universities, professor of philosophy at Saumur and future master at Geneva of Pierre Bayle; Pierre Viret and Nicholas des Gallars, pastors of Geneva, at Orthez; Isaac Casaubon, born and educated at Geneva, teacher there, at Montpellier, Paris, and in England; Lambert Daneau of Geneva and Leyden, at Orthez; Tremellius, a converted Jew, and ardent Calvinist, teacher of Hebrew in Cambridge and Heidelberg, at

Sedan; Andrew Melville of Geneva and Scotland, professor of theology at Sedan, 1611–1622; John Cameron of Glasgow, Geneva, and Heidelberg, at Sedan and Saumur; and nearly 40 other Scotchmen given by Bourchenin (p. 403).

The significant characteristics of Huguenot education were: an emphasis on education of laity; training for "the republic" and "society" as well as for the Church; insistence upon virtue as well as knowledge; the widespread demand for education and a view of it as essential to liberty of conscience; a comprehensive working system of elementary, college, and university training for all, poor as well as rich; an astonishing familiarity with Scripture even among the lowest classes; utilization of representative church organization for founding, supporting, and unifying education; readiness to sacrifice for education, a spirit of carrying a thing through at any cost; businesslike supervision of money, and systematic supervision of both professors and students; a notable emphasis on vernacular, arithmetic, Greek, use of full texts and libraries; and finally a progressive spirit of inquiry and investigation.

The Huguenots in exile show their characteristic care for education and social welfare. In London they established a famous hospital. In Dublin they founded a Huguenot Charitable Society to educate poor children and put them out as apprentices, "being persuaded that idleness and the lack of education are the greatest of evils." The Huguenot refugees established schools also in Holland. England would have had schools for the poor in every parish in 1807, had Parliament passed a bill supported by Romilly, a grandson of a Montpellier Huguenot exile of 1685, and an observer himself of Genevan and Swiss institutions. (See France, Education in.)

America. — Perhaps the most remarkable, because the most widespread and complex, illustration of its educational genius is to be found in the American colonies, where the various European streams of Calvinism so converged that the seventeenth-century colonists were predominantly Calvinists, not merely the Puritans of New England, but the Dutch, Walloons, Huguenots, Scotch, and Scotch-Irish, with a considerable Puritan admixture in Anglican Virginia and Catholic Maryland.

The Calvinistic founders of New England who brought over the *Institutes* and books of Calvin and his followers, and who read, quoted, and bequeathed them, led the Puritan exodus with the intent to establish a Biblical Commonwealth, one of whose logical corner stones, like that of Geneva and Scotland, was education. "One of the next things we longed for and looked after was to advance learning and perpetuate it to posterity," wrote the Puritan author of *New England's First Fruits*. In pursuance of this ideal the General Court of Massachusetts Bay, composed entirely of members of the Calvinistic churches of the colony, voted £400 for a school or college 6 years after the coming of the Puritan exodus under Winthrop. Forty men educated in Cambridge, England, were in New England in that year, according to Savage. Dexter estimates that "of the early emigrants to New England about 60 were from Cambridge and about 20 from Oxford"; but, as has been shown, even Oxford at the opening of the century was Calvinistic in its theology, and the New England ministers were from the Calvinistic Puritan element in both universities. Among the books which went to the founding of Harvard College library were Calvin's *Institutes* and his commentaries on 26 of the books of the Bible, and works by seven other Huguenot, Palatine, English, and Dutch Calvinists associated personally with Calvin at Geneva. Governor Winthrop owned and gave to Harvard Calvin's *Institutes* and books by two Geneva-trained men; and Governor Bellingham gave books by four such men. Elder William Brewster's library contained 7 volumes of Calvin and 18 by followers of Calvin who had studied at Geneva. The remainder of the books in the libraries of these four men were overwhelmingly Calvinistic. The Massachusetts Bay Act of 1647 requiring reading and writing schools in every town of 50 families and grammar schools preparing youth for the university in towns of 100 families, reflects the same premises and conclusions of the Calvinist that have been noted among the Genevans, Scotch, and Huguenots. Not merely in New England, but wherever Calvinistic colonists settled in America, they founded schools and colleges. The earliest permanent settlers of New Amsterdam, the Walloons of 1623, were guaranteed by their leader as being of *la religion réformée, i.e.* Calvinistic, and were granted permission by the States-General of Holland on this basis. Not only the Puritan founders of Boston and New Haven, of Harvard, Yale, Dartmouth, and Brown, but also the Walloon and Dutch founders of New York, Brooklyn, and Albany, and of Rutgers College, and likewise the Scotch-Irish founders of Princeton and the pioneer schools and colleges of Pennsylvania and the South were all Calvinists, not merely in dogma and discipline, but also in the wider features of the Calvinistic program and temper. In New Netherland, Peter Minuit, the second Director, had been a refugee from religious persecution, and a deacon in a Walloon church, and became an elder of the church in New Amsterdam. Peter Stuyvesant, of wooden leg and tinderlike temper, Director-General of the colony, had married the daughter of a Huguenot clergyman, and became one of the elders of the Dutch Reformed church of New Amsterdam.

The Scotch and Irish, or "Scotch-Irish," Presbyterians in America developed the impetus received from Knox and the parish and high schools of Scotland and from the influence of Trinity College, Dublin. Wherever they settled they established schools. Of 317 petitioners from North Ireland to Governor Shute in 1718 for land in New England, 9 ministers and 3 others were graduates of Scotch universities. Four years after they settled in Londonderry, N.H., these Scotch-Irish built a schoolhouse on the Common near the meeting house, and 2 years later were employing 5 school teachers and expending £36 4*s*. annually. In the 95 years from 1753 to 1848, Londonderry had 55 college graduates.

S. S. Green states that the Scotch opened the first classical school in the central and western part of New York (1741), and furnished many of the schoolmasters in provinces south of New York prior to the Revolution. In Pennsylvania, William Tennent, a graduate of Edinburgh, pastor of the Presbyterian church at Neshaminy, founded a log college to prepare men for the ministry (1726). Pupils of Tennent established other colleges. Three other Presbyterian ministers started churches and log colleges in Western Pennsylvania, from which developed Washington, later Washington and Jefferson College. Scotch-Irish Presbyterians also established Princeton, which absorbed the forces of Tennent's log college. Hampden Sidney (1776), incorporated 1783, the second oldest college in the South, was founded through the exertions of the Presbytery of Hanover, Va., which collected subscriptions of £13,000 in 1774–1775. One of the members of the first faculty was Samuel Doak, who about 1780 founded Washington College, Tenn., "the first literary institution in the Mississippi valley." North Carolina owed her first classical schools to the Scotch-Irish Presbyterians, mainly graduates of Princeton, itself a product of Scotch-Irish Calvinism. Missionaries sent by the New York and Pennsylvania Presbyterian Synods established churches, and, says Foote, "wherever a pastor was located, in that congregation there was a classical school" (*Sketches*, N.C., 513). Tate's Academy, Wilmington (1760); Crowfield Academy, Mecklenburgh County (1760); the famous log cabin academy school and seminary of David Caldwell (pupil of Tennent's log cabin), Guilford County (1766–1767); Alexander's classical school (1767) at Sugar Creek Presbyterian Church, out of which grew Queen's College (1770), later Liberty Hall Academy, under supervision of the Orange presbytery, are examples of such schools.

In South Carolina the most famous academy was founded (1793–1794) by Moses Waddel, a Presbyterian minister, a graduate of Hampden-Sidney College, who educated a remarkable number of South Carolinians eminent in national affairs, including Calhoun, Crawford, and a score or more of senators, judges, and cabinet members.

The Virginia Company, while under the control of men in sympathy with Puritan and "Genevan ideas" (1618–1625), made a vigorous attempt to found a college, unfortunately checked by the Indian massacre and James' annulling of the company charter. Sir Edwin Sandys, an admirer of Genevan republican ideas, secured a grant of 10,000 acres for an Indian college and English seminary, and the company sent Thorpe over to superintend them.

A detailed discussion of the educational activities of the American colonists is given in the article COLONIAL PERIOD IN AMERICAN EDUCATION, and further details in the historical section on the educational system of the several original states. See also the article on ACADEMIES for the educational influences of the Scotch-Irish.

The remarkable development of colleges and compulsory free schools among Calvinists was not entirely due to any single theological tenet; but the historic working Calvinism of Calvin, Genevans, Huguenots, Scotch, Dutch, English Puritans and the American colonists was far more than a theological dogma. Calvin and all these Calvinists had a common program of broad scope — not merely doctrinal, but also political, economic, social — and similar ideals and institutions. Their common program and their social insight demanded education of all as instruments of Providence for church and commonwealth. Their industrious habits and productive economic life provided funds for education. Their representative institutions in both church and commonwealth not only necessitated general diffusion of knowledge, but furnished the organization necessary for founding, supervising, and maintaining in wholesome touch with the common man both elementary and higher institutions of learning. Their disciplined and responsive conscience, their consequent intensity of moral conviction and spirit of self-sacrifice for the common weal, compelled them to realize in concrete and permanent form their ideals of college and common school.

H. D. F.

See also references under articles on CALVIN, and GENEVA, UNIVERSITY OF.

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For references on American Colonies, see article on Colonial Period in American Education.

CAMBRIDGE, CITY OF. — A city in Massachusetts, fourth from the largest in point of size. Harvard University and Radcliffe College are located in the city. In 1900 Cambridge had a total population of 91,886, and in 1909 its estimated population was 101,872. Its school census, 7 to 14 years of age, was 11,500 in 1909; and its total school enrollment was 17,135 in day schools, and 2652 in night schools. In addition the enrollment in private and parochial schools was 4014. Of the population of 1900, 94 per cent were native born, and the foreign born were chiefly English and Canadians. The city is essentially residential.

History. — The first school in Cambridge was opened in 1642. This was a privately supported school until 1654, when a small "rate" was levied to help to support the teacher. For 150 years after this time the schools in the town had a struggle for existence. During the first half of the nineteenth century a number of schools was opened, and a School Committee was appointed. In 1840 the first printed school report was issued. This shows that Cambridge was one of the earliest cities to grade its schools, there being 19 schools in existence, divided into alphabet, primary, middle, grammar, and high school grades. In 1838 a central classical high school was established, but this met with much opposition, and in 1843 it was abandoned, and 3 classical teachers were put into 3 different grammar schools in the town. In 1847 the central high school was reëstablished, and in 1848 the classical teachers in the grammar schools were discontinued. In 1846 the city was incorporated, and a School Committee of 7 was provided for in the new city charter. In 1858 the number of committeemen was raised to 10, and in 1868 to 15, at which number it remained for 40 years. In 1851–1852 a private evening school was established, which in 1868 was taken over by the city. In 1871 evening schools of drawing were established, and in 1889 an evening high school was provided. In 1845 a supervisor of music was employed; in 1869 drawing was introduced; and in 1877 sewing was included in the curriculum. In 1868 the first city superintendent of schools was employed; and in 1873 the first city truancy officers were appointed. In 1870 a city training school was opened, which in 1884 was transformed into the present Wellington Training School. In 1885 free textbooks and supplies were provided. In 1886 the English and the classical departments of the high school were divided, and 2 high schools created. In 1889 the kindergartens of the city, which had been under private control for 11 years, were adopted by the city school department. In 1896 medical inspection was introduced. In 1898 the Cambridge Manual Training High School, established and equipped by Mr. F. H. Ringe, was given to the city and became a third high school known as the Ringe Manual Training High School. In 1909 a reorganization was effected and a new School Committee of 5, elected 1 from each of 5 wards, displaced the old Committee of 15. A Superintendent of Schools, elected annually, acts as the executive officer of the new committee in all matters of instruction.

Present System. — In 1909 the school system of Cambridge consisted of 52 schools, and employed 430 teachers and 25 supervisory officers. Of these 71 were in the 3 high schools. Sixteen kindergartens are maintained, employing 30 teachers. The city school department employs supervisors of music, drawing, physical training, and primary work; a corps of truant officers; and a school nurse. The Wellington Training School, maintained by the city, is an apprentice school for future elementary teachers. Only graduates of approved high schools and a state normal school are admitted. The term of service is 1 year. The first 7 grades of the school are taught by the apprentice teachers, under the supervision of a master and 3 assistants. About one third of a regular teacher's salary is paid to an apprentice. The object of the school is to initiate new teachers under conditions likely to insure their becoming successful teachers in the schools of Cambridge. A school term of 188 days was provided in 1908–1909. The 8 evening schools employed 93 teachers, and enrolled 2780 pupils. Four of these were elementary schools, 2 were drawing schools, 1 an industrial school, and 1 an evening high school. Vacation schools were opened in 6 buildings in 1908. Summer playgrounds, with organized play and occupations, are maintained in the schoolyards and public parks. The total cost of maintaining the schools of Cambridge in 1908–1909 was $499,585.61. E. P. C.

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CAMBRIDGE PLAN OF ELEMENTARY EDUCATION. — See Grading and Promotion.

CAMBRIDGE,[1] UNIVERSITY OF. — The early history of the University of Cambridge and that of the town is so closely interwoven that a few words about the latter are necessary in order to render the former intelligible. The town of Cambridge has been proved by recent research to be of dual origin. (The view taken by the historian E. A. Freeman, that the whole town stood originally on the northern bank, is now abandoned; the late Professor Maitland having conclusively proved the contrary. See his *Township and Borough*, p. 99.) There was a town that grew up round the castle on the north or left bank of the Grant or Cam, and there was an older town that had grown up on the south bank round the church of St. Benet. The latter church belonged to pre-Norman times, and from its towers the townsmen may have marked, not without misgiving, the toil of the workmen employed by William the Conqueror to build the castle. In the expanse that lay between St. Benet's and the river, there was also a hospital of Augustinian canons, dedicated to St. John the Evangelist, whose employment, as distinguished from that of secular canons, was mainly to say masses and to visit and tend the sick. In Domesday, the town had borne the name of Grantbrigge, and, standing, as it did, at the point of junction of two great Roman roads, must always have been a place of some importance. In the early part of the twelfth century, Ely was made the seat of a bishopric, and as Cambridge lay in the newly created diocese, it continued from that time to be subject to the jurisdiction of the Bishop of Ely. In 1280, Hugh Balsham, Bishop of Ely, and a distinguished patron of learning, introduced into the hospital a body of secular scholars, at the same time providing for the maintenance of the latter by an augmentation of the revenues. The regular canons and the seculars proved, however, to be incongruous elements, and in the year 1284 (shortly before his death), Hugh Balsham transferred his scholars to two hostels near the Church of St. Peter, outside Trumpington Gates, and here the scholars held their religious services. The gates opened on to a bridge over what was known as the King's Ditch, — a narrow confluent of the Cam which represented the southern boundary of the town, — and within the town, near the gates, stood St. Botolph's Church. St. Botolph was the patron saint of the traveler, and in the chapels of the church travelers, on setting out from the town or arriving from the south, would offer up their prayers for their protection or their thanks for a journey safely accomplished. It is in these primary conditions that we have the key to the original relations between the town and the university, — for it is evident that the students of Peterhouse, who, when the gates at the bridge were closed at night, found themselves practically shut out from communication with the town, must have considered the risks attendant upon a chance attack by marauders in the open preferable, on the whole, to the chronic molestation of the townsmen. In the thirteenth century, however, we find both the Franciscan and the Dominican friars establishing themselves within the town boundaries, soon to be followed by the Carmelites and the Augustinians. Then, in 1229, the student body received a considerable accession in the migration of a number of students from the University of Paris, and in 1240 by a like migration from Oxford. On the other hand, there are instances of emigration of students, as, for example, from Cambridge to Northampton in 1261 and from Oxford to Stamford in 1333; such secessions, however, were systematically discouraged both by the Crown and by the ecclesiastical authorities; and no third university was actually founded until the time of Cromwell, by whom the foundation of Durham University (*q.v.*) was sanctioned in 1658. In Cambridge itself collisions often took place between the students and the townsmen, the hostels in which the former lived being frequently attacked, and hence, partly, the recognized necessity for colleges. But even colleges were not secure, and in 1381 Corpus Christi lost all its books, charters, and other writings. Similar attacks about the same time were made upon the house of the Carmelites, and also upon St. Mary's (the university church), where the university chest was rifled and numerous official documents destroyed, — events which further attest the difficulties and dangers amid which the university developed, and to be regarded as partly attributable to the less stringent discipline of either the Friary or the College, when compared with that of the monastery, where the inmates were isolated from the outside world. The rule of Peterhouse — as the modest foundation outside the gates was now called — was little more than a simple adaptation of that given by Walter de Merton to his scholars at Oxford (1274), and a better model could not have been found in any university in Europe. Forty years later, Michaelhouse (afterwards merged in Trinity College) was founded, with statutes of its own; and the foundations of Pembroke Hall (see COLLEGE; HALL), in 1347, by Marie St. Paul, a warm friend of the Franciscans, and that of Gonville Hall, in the following year, by Edmund Gonville, an equally warm friend of the Dominicans, afford satisfactory evidence that the college was not, as yet, necessarily regarded as an institution hostile to the religious orders. It is in connection with Pembroke that we have the earliest example (1366) of an original college rule at Cambridge, and the statutes are consequently of considerable interest. Among these we may note that of the 30 scholars for which the college was designed, 6 at least were required to be in holy orders, and the whole body were to apply themselves to the faculty of arts or of theology; that, of the two rectors appointed, one was a Franciscan and the other a secular priest, both of whom were required to have graduated in the university. A fellow might be of any nation or realm, but preference was to be given to a native of France; prior to his admission, he was required to pledge himself by oath to vacate his fellowship as soon as he was appointed to any more lucrative place; and in the choice of scholars on admission, preference was to be given to duly qualified candidates from the parishes pertaining to the college rectories.

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[1] The writer of this article is under obligation to Professors Sir Clifford Allbutt, Liveing, Hughes, James Ward, and Shipley and to Mr. Rouse Ball for valuable assistance; also to Messrs. Longmans & Co. of London for permission to use his own shorter *History of the University* (1888), now out of print.

Clare Hall, founded in 1359, adopted with little modification the rule of Walter de Merton; but King's Hall, founded in 1337 by Edward II, was designed by him to encourage the study of the civil and the canon law. The execution of his design, however, devolved upon Edward III, while the statutes were given by Richard II. With the fifteenth century other influences come into play. Lollardism, while it had been productive of increased mental activity, had also been a source of much contention at both universities, and was now repressed by Archbishop Arundel (1396–1413) with a strong hand. By virtue of his authority as metropolitan, he cited the chancellors of both universities before him to take the oath of obedience on assuming office. He was, however, confronted by a display of ultramontane feeling alike at Oxford and at Cambridge, which led them not only to refuse compliance, but to appeal to the Roman pontiff; and in 1430 Pope Martin V was induced to appoint a commission to inquire into the whole question, and the prior of the Augustinians in Barnwell (an ancient suburb of Cambridge) acted as president. Certain documents were produced in evidence which were unquestionably spurious, but which the prior accepted as of good authority; and the chancellor, accordingly, was able to obtain formal exemption from all ecclesiastical jurisdiction within the realm, that of the Bishop of Ely not excepted. The foundation of Eton College and King's College in 1441 by Henry VII afforded occasion for a similar display of church feeling. In each case the endowment was derived from the confiscated estates of the alien priories (*q.v.*), — "cells," as they were termed, of different religious orders in England which represented dependencies of foreign monasteries, — and the revenues thus appropriated to King's made it the wealthiest of all the existing Cambridge colleges. Its code was little more than a reproduction of that given by William of Wykeham — Archbishop of York, and a noted opponent of the monks — to New College, Oxford; but just as the chancellor of the university had been made independent of episcopal authority, so the community of

King's College was declared, by papal bull, independent, not only of the Bishop of Ely, but also of the university authorities, in all matters of discipline as distinguished from instruction. For four centuries, accordingly, the society, although it remained subject to the university as far as regarded keeping of scholastic acts, exercises, lectures, and disputations, was noted as one in which the primary designs of academic life were, to a great extent, ignored.

Queens' College, founded under the name of the "Queens' College of St. Margaret and St. Bernard," and endowed in 1448 through the good offices of Margaret of Anjou, remained (owing probably to the Civil War) without statutes until 1475, when Elizabeth Woodville, the consort of Edward IV, took the new society under her protection and gave it statutes. The credit of creating the college having been thus shared by two queens, the name is written Queens' College, as distinguished from Queen's College, Oxford, founded by Queen Philippa. The statutes of St. Catherine's Hall, founded in 1475, are chiefly to be noted for the fact that the society was to be composed exclusively of the secular clergy. In the three foundations of Jesus College (1497), Christ's College (1505), and St. John's (1511), we have successive illustrations of the great revolution then in progress, — Jesus College rising on the site of the extinct nunnery of St. Rhadegund, St. John's on that of the former hospital of St. John the Evangelist, while Christ's College was the first to represent the learning introduced by Erasmus (*q.v.*). That great scholar, while in Cambridge, "kept" in Queens' College; and there it was that he carried on his labors on the *Novum Instrumentum* and on his edition of Jerome. Bishop Fisher, his patron, was confessor to the Lady Margaret, the mother of Henry VII, and also a distinguished benefactor of the university; and he also drew up successive codes of statutes for Christ's College and St. John's. But while the studies which he especially patronized were partly new — for it was now that Hebrew and Greek first began to be recognized — his statutes cannot be defended from the reproach of embodying much that was becoming obsolete. In 1521 a translation of the *De Temperamentis* of Galen by Thomas Linacre was printed *apud praeclaram Cantabrigiam,* at the press of John Siberch, most probably a native of Cologne. Siberch printed also other books about the same time, but it was not until more than half a century had elapsed, in 1583, that Thomas Thomas was appointed University Printer.

The Reformation ushered in a series of changes to which Cambridge, from its geographical position, was especially open, — the commercial intercourse between Northern Germany, on the one hand, and King's Lynn, Norwich, and Ipswich, on the other, being in those days already considerable. Under the auspices of Thomas Cromwell, Henry VIII's chief minister, the movement acquired great force in the university, which was, however, partly saved from the hands of the courtiers who sought to plunder it by Henry's personal intervention, an occasion on which he is said to have observed that he thought he had not, elsewhere in his realm, "so many persons so honestly mayntayned in lyvyng bi so little lond and rent." By the Royal Injunctions of 1535, provision was further made for instruction in logic, rhetoric, arithmetic, geography, and music; while the study of Aristotle was rendered more intelligent by the substitution of the commentaries of the humanists for the obscure glosses of the schoolmen. An additional stimulus was imparted by the presence of some distinguished scholars as teachers, — among them Sir John Cheke (*q.v.*), John Redman, and Roger Ascham (*q.v.*). Ascham was appointed Reader in Greek at St. John's, where he received a liberal salary, and consequently was emboldened to make a timely protest against a crying abuse, — the indiscriminate admission of the sons of the wealthy, who had come up with no intention of serious study and with correspondingly small attainments. His protest, addressed to Cranmer, reached the ears of Henry VIII, and in the new statutes given to St. John's in 1545, it was expressly provided that no pensioner should be admitted who did not already possess a sufficient knowledge of Latin to enable him to profit by the course of instruction. This proviso may be regarded as ushering in a more general and highly important enactment, whereby the university formally renounced the function of teaching "grammar" (*i.e.* Latin), thereby recognizing the instruction given in the grammar schools throughout the country as preparatory to its own.

Magdalene College, founded in 1542, affords another illustration of the change in progress, as it rose on the site of an ancient foundation designed by the Benedictines for the housing of members of their order studying in the university. Sir Thomas Audley, the founder, — himself enriched by the plunder of the monasteries, — provided an ample endowment; but it was not until the year 1554, in the reign of Philip and Mary, that the college received its statutes, which consequently reflect comparatively little of that regard for classical learning to be noted in the original statutes of Christ's and St. John's.

During the Reformation, moreover, the libraries throughout the university had sustained irreparable losses. "At the present time," says Dr. James, "only 19 of the University Library books are known to exist out of 330. At Corpus Christi, 3 out of 75; at Queens', I believe, none; at King's, 1 out of 176; at Trinity Hall, 1; at St. Catherine's, none out of 100." (See "The Foundation of Libraries," in Vol. IV, pp. 422–425, of *Cambridge History of English Literature,* 1909.) To Matthew Parker (Archbishop of Canterbury 1559–1575) belongs the credit of being almost the first to introduce into the university, not only the discrimination of the bibliophilist, but also an adequate sense of the duties that devolve on the librarian. On succeeding to the mastership of Corpus Christi College in 1554, he had drawn up a series of regulations designed to protect the collection which he ultimately bequeathed to the college from like spoliation; and in a small chamber over the ante-chapel the famous Parker Mss. were safely housed for some 250 years. As archbishop, again, he had the first pick of the whole of the plunder of the libraries and muniment rooms of the dissolved religious houses; and his suffragans were only too ready to gain his favor by almost forcing upon him the treasures of the cathedral libraries.

Of the transition from the medieval to the modern conception of education and learning, Trinity College (1546) affords a striking example. The original society was composed exclusively of members of the university; while several distinguished Greek scholars from St. John's were among those elected to the first fellowships. It was also a promising sign, that the only limitation imposed in such elections, with respect to counties, was that not more than 3 fellows at any one time should be natives of the same county.

The enforced exile of a large number of Protestant scholars, during the reign of Mary, must be looked upon as marking a period of reaction; and the burning of Cranmer, Latimer, and Ridley at Oxford and that of John Hullier, a Protestant scholar of King's College, at Cambridge, brought home to both those communities the stern realities of the religious crisis. The administrative changes that were introduced, however, along with the new statutes, given in 1557, generally known as those of Cardinal Pole, proved almost inoperative; and from the acceptance of the chancellorship of the university by Sir William Cecil in 1559 we may date the commencement of a new era; but on the other hand, the political effects of the rigorous measures that characterized the preceding reign were long and severely felt. The Marian exiles, as they were termed, had encountered abroad privations and sufferings which gave peculiar intensity to their sense of wrong; and during their intercourse with the Protestant theologians of Germany and Switzerland, they had exchanged views and arrived at conclusions which materially modified their own former theological opinions. On their return to England, many of them, again, came before long under the influence of the Scotch School of Presbyterian doctrine, and out of these several phases of Protestantism, English Puritanism was, in turn, developed. Elizabeth, however, who had a genuine predilection for the Anglican ritual, was distinctly opposed to these foreign influences; and, assisted by Cecil, did her best to hold the new movement in check, while it also soon became evident that it was her design and that of most of her ministers, at once to make the universities more efficient training schools for the clergy and also to bring them into closer relations with the Crown. It was thus that, out of the 5 faculties, of which Henry VIII had founded professorships, — theology, civil law, medicine, Hebrew, and Greek, — only those which subserved the clerical profession continued to flourish. The study of the civil law almost died out, dissociated as it was alike from the canon law and from English law; while that of medicine, which generally formed part of the education of the cleric, maintained its ground, and was adorned, in the seventeenth century, by names such as those of Dr. Caius (*q.v.*), Gilbert, Harvey, and Glisson. Theology, however, remained the predominant study; and to train and send forth well-equipped divines, possessing a competent knowledge of the original tongues of the Old and the New Testament, adequately read in the most authoritative Patristic literature, and fitted by practice in the art of disputation to hold their own against the assailants of their Church's doctrines, became almost the sole professed aim of the instruction imparted and the exercises required either at Oxford or at Cambridge.

Enough, however, still remained of Roman observance, ritual, and adornment in the services of the Church to afford the Puritan a pretext for the manifestation of serious discontent; and the repression of such feeling seemed to the compilers of the Elizabethan Statutes of 1570 a foremost necessity. The new Code, accordingly, while still retaining earlier enactments (known as the *Statuta Antiqua*, and medieval alike in their conception and their origin), also embodied new provisions with respect to the constitution of the *Caput* and the conditions of graduation, which tended to place the administration of affairs in the hands of a virtual oligarchy. The *Caput* — so called from its being composed exclusively of the Heads of Colleges — not only became the supreme authority, but the annually elected Proctors, who, from the opportunities they had before possessed, had represented, to some extent, the views and aims of the academic body at large, were so far deprived of their privileges that their office lost much of its original importance. The process of graduation was not only made more stringent, as regarded the times of "proceeding," from matriculation to each subsequent stage of the academic career, but the requirement of taking a solemn oath, on each such occasion, served to render the ceremony, afterwards known as "subscription," a powerful weapon in the assertion of a spiritual authority, owing to the terrors with which the guilt of perjury was in those days invested.

The foremost promoter of the new Statutes was John Whitgift, master of Trinity College (1567–1577), whose services were recognized by his promotion in 1583 to the Primacy of Canterbury, — an event which roused the Puritan party to renewed efforts. His foremost opponent at Cambridge had been Thomas Cartwright, formerly Lady Margaret's Professor of Divinity, who in 1584 printed at the University Press a translation of Walter Travers' *Disciplina,* — a treatise propounding an improved system of Church discipline, and aimed alike at the Church and at the Royal Supremacy. Whitgift forthwith caused the whole impression to be seized and burnt; but before the year had closed, the foundation of Emmanuel College gave significant proof of the determination of the Puritan party not to be driven from the university. Its founder was Sir Walter Mildmay, one of Elizabeth's most trusted ministers, who was openly taxed by Elizabeth, at the time of granting the charter, with the design of founding a Puritan college. The justice of the royal comment was soon attested by an agitation which took its rise at Emmanuel; and before long, William Whitaker, the eminent master of St. John's (1586–1595), evinced his sympathy with the movement; while the foundation of Sidney Sussex College in 1596, with statutes which were little more than a transcript of those of Emmanuel, proved an additional accession. Sidney is also to be noted as the first Cambridge college which opened its fellowships to Scotchmen and Irishmen.

In 1604 both the universities received the right of each returning two burgesses to Parliament, whose special function was to be that of giving regular information to the House "of the true state of the University and of every particular College." The *Caput* who made an injudicious effort to arrogate to themselves the right of selecting the candidates were defeated, — Sir Francis Bacon (*q.v.*) and Sir Miles Sandys being returned by a large majority of the qualified voters in the university. The great name of Bacon thus stands associated with the earliest assertion of the political rights of the academic body; of his subsequent loyalty to Cambridge and his zeal for her interests there can be no question. The Puritan movement also continued to gather force, and John Preston, who succeeded to the mastership of Emmanuel (1622–1628), and William Perkins, fellow of Christ's College, alike famed as learned divines and eloquent preachers, gave powerful aid both by their teaching and example. Laud himself was so dissatisfied with the aspect of affairs that he announced his intention of visiting the university in his capacity of metropolitan, — a design which he was never able to carry into effect. In April, 1641, the House of Commons resolved that a statute passed in 1603, imposing subscription upon young scholars, should be rescinded, and that neither graduates nor undergraduates should in future be called upon to subscribe the customary oaths. In the meantime Laud's coercive policy, in which he was actively supported by some of the heads of colleges, drove not a few distinguished graduates into exile both on the Continent and in America; and the foundation of Harvard College (*q.v.*) in 1638, — a measure dictated by the dread on the part of the founders of having an illiterate ministry in the churches, — is a well-known episode in the history of education in the New World. As the result, Massachusetts can claim to have presented the earliest example of a system of public education supported by the contributions of the citizens and imposed as obligatory on their children. It may also be noted (a fact less generally known) that it was at Cambridge in England that a meeting was held, in 1629, of the Massachusetts Company, which resulted in their final resolve to cross the Atlantic and settle in the New World.

In the course of the Civil War and throughout the period of the Commonwealth, the domination of the strictly Puritan party was superseded by that of the Presbyterians, who, during the Protectorate, were, in turn, displaced to a great extent by the Independents; and both universities were anticipating further measures of reform, especially in relation to the colleges, when the restoration of monarchy took place. With regard to the state of either university during the years 1649 to 1660, it appears to be undeniable, that the influence of the academic authorities was on the whole successfully exerted in promoting sound learning and the maintenance of discipline; and even Clarendon, who succeeded at the Restoration to the Chancellorship of Oxford, was fain, notwithstanding his royalist sympathies, to admit that such was the case. In the great reaction that accompanied the Restoration, loyalty to the Crown and conformity to the liturgy of the Church became, however, almost inseparably blended in political theory; and in 1662, the Act of Uniformity made it imperative that all those who held office in the university should subscribe a declaration of compliance with the principles enunciated in the said Act. At Cambridge, during the years that immediately followed, the chief symptoms were those of lethargy with regard to learning and laxity with regard to discipline. The Cartesian, or "new" philosophy, as it was termed, gave rise to a considerable controversy which distinctly traversed the divisions of party, — John Pearson, master of Trinity, for example, being among its opponents, and his successor, Isaac Barrow (master, 1673–1677), one of its supporters. In mathematics it produced almost a revolution; and it also found favor with some of the leading "Cambridge Platonists," who hailed the prospect of attaining by its method to greater certainty in questions both of mental and natural philosophy than could be reached by the mere dialectician.

This remarkable school, — also designated as the "Latitude-men," on account of their advocacy, not only of a less narrow standard of religious orthodoxy than that prescribed by the Creed and Articles of the Church, but also of the recognition of a certain genuinely religious element in philosophic teaching prior to the Christian era (see, in connection with this subject, Sihler, *Testimonium Animae, or Greek and Roman before Jesus Christ*, New York, 1909), — attracted to itself no small attention both at the university and abroad, and continues still to engage the notice of investigators in the same field. Chief among its teachers was Whichcote, Provost of King's College (1644–1660), famous both as a tutor and a preacher, but especially distinguished by the catholic spirit and enlightened judgment which characterize his celebrated *Aphorisms*, — a collection of pregnant utterances, — the outcome of his observations on some of the moot questions of his day, and especially on certain aspects of Cambridge life and thought, — still not unfrequently quoted, and more particularly the aphorism wherein he asserts that there is nothing more unnatural to religion than contentions about it. Whichcote, indeed, may be best described as the Socrates of this new philosophy; he published nothing; while at Christ's College, which became the center of the movement, — as originating partly in the teaching of Joseph Mede, a famous teacher of that society, — Cudworth, the master (1654–1688), and Henry More, a fellow, were voluminous writers. Other notable members were George Rust, John Smith, and Nathaniel Culverwel (all three distinguished as authors), and John Worthington (the master of Jesus College), who undertook the labor of editing Mede's works.

The Cambridge Platonists were by no means free from the credulity, the superstition, and the mysticism of their age, but at the same time they rose considerably above the average standard of both belief and sentiment, and were themselves united by one common conviction, which may be described as the keynote of their discourse, that the aims of religion and philosophy being alike directed toward the attainment of truth, it was impossible to believe that the results of each would not ultimately be found in harmony. This belief it was that led them to look with sympathy on the rise of the Royal Society (*q.v.*), which was regarded with no little apprehension by many of the defenders of orthodoxy. The society, although it took its rise at Oxford, included from the first a considerable Cambridge element, represented by the names of Seth Ward, Walter Pope, John Pell, Lawrence Rooke, William Croone, and Henry Power. By the Church, on the other hand, the Platonists were at first gladly hailed as virtual champions of its cause; and Henry More especially distinguished himself by the ability with which he exposed the prevailing tendency to what was then known as " enthusiasm," or the right of unrestrained private judgment in the enunciation and declaration of religious belief. The multiplication of sects during the Commonwealth had in fact been accompanied by so much dangerous speculation with regard to the relations of Church and State, and also by such sweeping projects of reform — including, it is to be noted, the abolition of the universities themselves — that More here found himself in sympathy with the great majority of educated divines throughout the realm. And down to the time of Charles Simeon (1759–1836) the word " enthusiasm " became a customary expression with those who held it to be their duty to discourage all attempts to establish theories of theology as a progressive science, or of church history as admitting of a mode of treatment whereby it might be rendered susceptible of illustration by the study of the history of other religions, and the Christian belief itself thus receive more adequate application as a rule of individual belief and practice. " Religion," said John Smith, one of the ablest of the Platonists, " though it hath its infancy yet it hath no old age."

On the other hand, such works as Pearson *On the Creed* (1662) and Tillotson's *Rule of Faith* (1666), the latter written against Roman Catholicism, were designed to define and, to a certain extent, stereotype the outlines of orthodox belief, — the suppression of " Dissent " and of Catholicism alike having now become a primary object with the Church. In relation to the former, indeed, the efforts of the clergy were attended with so much success that in some parts of the country the " meeting house " almost disappeared. In 1681 the university, in an address presented to King Charles at Newmarket, made formal declaration of the theory that the King derived his title, not from the people but from God, " by fundamental hereditary right of succession "; and when, nine years later, a large body of Episcopalian divines throughout the country refused to violate the oath that they had taken to James II by swearing allegiance to William and Mary, a fresh source of contention and disunion was created in the university. At St. John's College no less than 20 of the fellows were ultimately ejected as Nonjurors, among whom was Thomas Baker, the antiquary (1656–1740), who continued notwithstanding to reside in college, his high character and eminent services to learning pleading effectually in his favor. During his lifetime he presented 23 volumes of his manuscript collections to Harley, Earl of Oxford, which are included in the Harleian collection now preserved in the British Museum; eighteen others were bequeathed by him to the university library in Cambridge, and the whole series is of the highest value in relation to the history of the university and the colleges at large. His *History of St. John's College*, edited by the Rev. Professor J. E. B. Mayor (2 vols., 1869), is especially to be recommended to all students of the literature relating to learning and education in England.

Although a certain spirit of individual self-assertion and independence continued to manifest itself in Cambridge, and Whiston, the successor of Newton in the Lucasian professorship (1702–1710), and Conyers Middleton, Bentley's leading assailant at Trinity College, who from 1721 to 1750 filled the office of *Protobibliothecarius*,[1] were distinguished by the boldness with which they assailed the traditions of religious belief, after the accession of the Hanoverian dynasty the controversial spirit to a great extent died out; and throughout the nation at large, as well as in the universities, the study of theology itself ceased to attract the same attention. "Latitudinarianism," says Lecky, "had spread widely, but almost silently, through all religious bodies, and dogmatic teaching was almost excluded from the pulpit." Montesquieu, indeed, on this very account, commended the English Church of his time, as an institution "that was divested of some of its worst prejudices and was the source of many practical advantages." It was not surprising, therefore, that an apathy which pervaded the nation should have extended to the universities.

In the meantime the genius of Bentley, who had succeeded to the mastership of Trinity College in 1700, and that of Isaac Barrow and of Isaac Newton, served to sustain the reputation of Cambridge as a seat of exact learning and scientific research. In the time of Newton and his school the special characteristic of Cambridge mathematics was its application to astronomy and physical problems, and in the latter notably to the theory of light. In 1747 the first examination for the Mathematical Tripos was held, and occupied at first only two and a half days; while throughout the latter half of the eighteenth century the study itself made little advance. In 1836, however, the examination was prolonged to 6 days, and subsequently to 8. The interest it now excited invested mathematics with an importance which cannot but be regarded as excessive, it being required that even candidates for classical honors should previously have obtained the like distinction in mathematics, — Whewell himself defending this requirement on the ground that the latter study was "the principal means in the cultivation of the reasoning faculty." On the other hand, Adam Sedgwick and Sir William Hamilton (*q.v.*) gave an opinion unfavorable to the maintenance of the restriction thereby placed on classical studies, and in 1850 it was abolished; and since 1885 French or German have been admitted as alternatives in what is known as the "Previous" or simple pass examination. In the Tripos itself, moreover, changes and modifications have been introduced; and in 1906 it was generally admitted that the system in force was unsatisfactory, that the subjects of advanced study were not suitable for competitive examinations, and that it was desirable to give facilities to students for first passing through a vigorous course on the broad principles of mathematics, and then passing an examination in the same, — after which they might devote themselves to special departments in mathematics, or to new subjects, such as physics, engineering, and other branches of science. Eventually the Tripos itself was remodeled for what was essentially a new system, the order of merit in each division being abolished, and candidates being allowed to take the examination as early as the second term of residence, although not thereby obtaining a degree. Throughout the greater part of the nineteenth century to the present time the Cambridge school has enjoyed a wide and well-deserved reputation, adorned, as it has been, in mathematical physics by the names of Sir George Stokes, Lord Kelvin, Professor Clerk-Maxwell, Lord Rayleigh, Sir J. J. Thomson, and Sir Joseph Larmor, — in astronomy by Professor Adams and Sir George Darwin, — in pure mathematics by Professors Cayley and Sylvester. In the last-named branch it has acquired greatly increased vigor within the last twenty years under the teaching of Professors Forsyth and Hobson and Dr. Baker.

As early as 1815 examinations were held for the civil law classes, but were limited to a modicum of Roman law. With the institution of the Downing Professorship of the Laws of England, however, regulations for the Act in Law were drawn up and the degree of Master of Laws instituted,[1] and the first Law Tripos list was published. Temporarily merged in 1868 in a Law and History Tripos, this examination was again reconstituted in 1873 as that of the Law Tripos only, — the Historical Tripos being started as a separate examination. In 1800 Downing College received its charter as designed for students in "law, physic, and other useful arts in learning"; but at the present time the examination for minor scholarships is restricted to mathematics, law, history, and natural science. The difficulty presented in connection with the new Triposes of adequately recognizing not only their increasing literature, but also their relations to strictly cognate fields of research, gradually brought home alike to teachers and examiners the necessity of dividing the Tripos itself into two parts, such parts being distinct from each other and having different examiners. In 1881 the Classical Tripos (which dated from 1824) was thus divided, — the First Part representing the original examination; the Second, the cognate subjects of literature, ancient philosophy, history, archæology, and language (of which only two could be taken). In the First Part composition in Latin and Greek prose and verse continued, as before, to be obligatory, and the candidate who passed the examination was thereby qualified for an honor degree. At the same time it was declared permissible for those who had passed in the First Part of some other Tripos to take the Second Part of the Classical Tripos; and in this manner candidates not possessing the required competency in composition were enabled to obtain recognition of their attainments in any two of the five above-named sections. Thus, although in the opinion of many there is reason to apprehend a decline in exact scholarship, the recognized area of classical learning has undoubtedly received considerable extension, and its utility in relation to the history of the past has been correspondingly increased.

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[1] An office created on the occasion of the presentation of the magnificent library of Moore, Bishop of Ely, to the university by George the First in 1715; as this collection was in itself more than double the then existing university library, another officer was appointed to provide for its adequate surveillance.

[1] Down to 1535, the term *legum* denoted the Roman or Civil Law as distinguished from Canon Law, degrees at that time being given in both; but from 1535 to 1854, although the plural was retained, it denoted only the Roman Law as the sole subject of legal degrees, a usage defended by Sir Henry Maine, on the ground that the plura *leges* is, in fact, equivalent to the singular *jus* (in which the Cambridge degree is conferred), and thus covers all the law which may be studied in the university, or any part of it.

The Moral Sciences Tripos, instituted in 1851, mainly through the efforts of Dr. Whewell, has similarly undergone material alteration. Originally, like the Law Tripos, it incorporated subjects from which it has since been dissociated, — that of ancient philosophy, which now belongs to the Classical Tripos, and that of political economy, which was transferred in 1905 to the Economics Tripos. On the other hand, the creation of a lectureship in logic (1884), of a professorship of mental philosophy and logic (1897), and of a lectureship in experimental psychology, have afforded further facilities for similar or cognate studies. In 1902 a moral science lectureship was founded in memory of the late Professor Henry Sidgwick, a distinguished benefactor to the university in not a few relations. At the present time the encouragement held out by the colleges to the study may be regarded as adequate, while the standard of examination is undoubtedly high. And although the number of students is small, the number of professors of philosophy at present holding chairs in the United Kingdom, who have received their education in Cambridge, is at least equal to that of those who have been educated at Oxford.

The recognition extended to history has kept pace with the great development of the conception and literature of the subject during the last 30 years. Associated in the first instance as a Tripos subject with Law, it was regarded as concerned chiefly with institutions and with textbooks such as Waitz of Göttingen, Stubbs, Freeman, and Sir Henry Maine. In 1875, however, as the result of a series of discussions presided over by the late Henry Sidgwick, the study was placed on an independent footing; and since that time its expansion, both as regards the number of students and variety of studies, has been remarkable, and it was found necessary to divide the Tripos into two parts. In 1908–1909 the number of those who passed the examination had risen to 99 men and 9 women (respectively), in Part I; and to 72 men and 8 women in Part II. The contributions subsequently made to historical scholarship and learning by not a few of those who have thus acquired distinction, and the manner in which some, both by promise and performance, have acquitted themselves in English public life, is also noteworthy as evidence of the value of their training. It is in this connection, indeed, that some difference of opinion has manifested itself with regard to the moot question of the extent to which a university may, with advantage, adjust its training so as to render it directly preparatory for a profession; and some exception has been taken to the bias imparted by the late Sir John Seeley (Regius Professor, 1869–1895), to his generally admirable teaching, as calculated to create a school rather for the training of statesmen and public officials than for students proposing to devote their energies to prolonged original research. Such a tendency, however, has been partially rectified by the relegation of political science, political economy, and international law to Part II of the Tripos; although a yet more recent innovation, whereby general modern history has been similarly deferred, may be regarded as at least questionable, seeing that in England it is not often that any public schoolboy comes up to the university possessing, like a German *Abituriens*, a fair knowledge of the outlines not only of modern, but also of ancient and medieval, history. The introduction of essays in both parts of the Tripos appears to have been attended with excellent results.

In connection with medicine the question of the direct relevancy of university instruction to professional practice forces itself still more prominently on the attention. Somewhat more than half a century ago it began to be argued that a university, as contrasted with a technical school, finds its function in the training of the mind as an instrument, and in the fostering and developing of sound knowledge from a disinterested point of view; and that in the university, as such, the practical calling cannot be learned, but that it must be learned among practitioners actually engaged in the art. "When accordingly the theory of education was thought out afresh," says Sir Clifford Allbutt, "it was perceived that in neglecting to provide, in the University itself, a preliminary training ground and proceeding directly to apprenticeship in the hospitals, physicians had been guilty of a great error. Students so educated would be mentally untrained and unprogressive, although they might prove good craftsmen." Under the influence of Paget and

Humphry in Cambridge, and of Acland and Rolleston in Oxford, the faculty of medicine sprang again into fertility and began to flourish as of yore. In the first half of the nineteenth century, medical graduates were rare, and in some years there were none. At the present date the school in Cambridge numbers some 400 students, — "all of whom are well aware that in the University, whether the branch of study be medicine, or any other field of disinterested research and sound learning, they are being educated, not with the immediate intention of practice, but of mental enlargement and culture." This done, they proceed to the great technical schools in large cities to be instructed in the art of medicine.

Chemistry has been studied at Cambridge from very early times, and was the first special branch of natural philosophy for which a professorship was founded (1702). Newton had a laboratory in a small garden behind his rooms in Trinity College; and it may here be noted, as one of the advantages afforded by the collegiate system, as distinguished from the mere "hostel" or lodging house (so common in Continental universities), that the preëxisting arrangements for scientific instruction in the colleges often enable them to supplement the work of the university professor or lecturer. There are, for example, at the present time, among the 18 existing colleges, 15 duly appointed teachers of zoölogy (most of them specialists) whose instruction is available by all members of colleges. In Newton's time, and down to about the middle of the last century, chemistry was held to include all branches of molecular physics, such as the sciences of heat, electricity, and magnetism; and a candidate for a degree in "Arts" (under which term "sciences" were often included) could make a chemical problem the subject of his exercise, or "act." After the middle of the eighteenth century, however, the only avenue to honors in natural philosophy was by its mathematical treatment, and students of chemistry, other than those taking up medicine, were very few. A new era dawned in 1850, when the Natural Sciences Tripos was instituted. The professor of chemistry had, however, to work in his own laboratory, equipped and maintained entirely at his own cost, with one or two "advanced" students as his assistants. St. John's, indeed, in 1853 equipped a laboratory for its own students; and 12 years later the university fitted up an old building for a like purpose; but it was not until 1887 that the present commodious building was created and fitted in accordance with modern requirements. Since then the work of the school has gone on apace; the buildings have been extended, the appliances largely increased (with special provision for those engaged in research), and there is a very extensive spectroscopic equipment, including one of Rowland's largest gratings and an echelon spectroscope on Michelson's plan. There are now 600 students, including a fair number of researchers who have the opportunity of communicating their investigations to the Cambridge Philosophical Society, thereby profiting by the criticisms of experts, and being enabled to publish the results in the *Proceedings* of the Society. Advanced students from other laboratories, duly recommended, as well as graduates from other universities, are admitted to share the advantages for study which the chemical laboratory affords. By the foundation of the Cavendish Professorship of Experimental Physics (1871) the Professor of Chemistry was relieved from the duty of lecturing on heat, electricity, and magnetism.

The following enumeration of scientific chairs founded within the last half century marks the steady advance of the university in this direction: professorship of zoölogy and comparative zoölogy (1866); mechanism and applied mechanics (1875); physiology and surgery (1883); pathology (1884); agriculture, with special reference to protozoölogy (1899); biology (1906); agricultural botany (1908); biology, with special reference to eugenics (1908); astrophysics (1909). Laboratories, where required, have also been erected, which, with their adaptation to modern method, entitle the university to be considered a pioneer in this respect. Among the newly erected buildings, that appropriated to geology is perhaps the most palatial; while to trace the commencement of the study it becomes necessary to revert to the seventeenth century and to note the observations made and the collections formed by Martin Lister (1638–1712), Agostino Scilla, and Dr. John Woodward, the founder of the professorship, who died in 1728. Woodward stipulated in his will that the university should provide for the safe keeping and proper display of his collections and such additions as might be made to them, while the occupant of his chair was especially charged to guard the reputation of the fossils from the assertions of those who maintained them to be mere *lusus naturae*. One Thomas Nichols, of Jesus College, also published at the University Press in 1652 a curious old treatise by De Boot (1609) grounded on the treatise of Theophrastus (B.C. 374–286), and containing many quaint conceits respecting stones, both precious and common. A century later, the great controversy between the Wernerian and Huttonian schools set men observing and collecting with renewed energy, but although valuable material was added to the Woodwardian Museum, little was done in the way of research until the time of Adam Sedgwick, whose tenure of the professorship lasted from 1818 to 1873, and who carried on a memorable controversy with Murchison. Sedgwick drew sections across his typical regions, collected largely, and employed such skilled paleontologists as McCoy, Salter, and Morris to name and arrange his collections and to illustrate his works. On his death a meeting was held in the Senate House to consider what steps should be taken to do honor to his memory, and ultimately a fund was raised which, including value of old premises and buildings, amounted to more than £50,000, wherewith the Sedgwick Museum has been erected and partly fitted up. The Museum contains many private collections especially valuable from their association and from the collector's name. Among others, there is one of ox skulls from the neighborhood of Cambridge, which illustrates the line of descent of our modern breeds of cattle, — the bison, the urus (of which there is a specimen from the peat, with a polished stone implement sticking in its skull), and finally the Celtic shorthorn, which, crossed with the Roman breed, is the origin of all our domestic cattle. The history of the Fens themselves, carrying us back to the beginning of the age of Neolithic man, is also well illustrated. Last term (Lent, 1910) there were 8 lecturers and demonstrators engaged, along with 246 students, in carrying on the work of education and research.

The matriculation in the university for the academic year 1909–1910 was 1217. The Council have recently published a Report on the Constitution and Government of the University, in which a material alteration is proposed with respect to the fees now payable in order to entitle the payer to life membership of the Senate; and also, in place of the present Electoral Roll, the establishment of a "House of Residents," the composition of which is to be more strictly limited to residents who are actively participant in the work of the university and the colleges, but from whose decisions provision is to be made for appeal to the Senate under certain specified conditions. J. B. M.

The following table gives the date of the foundation, the enrollment of students, and the members of the Senate of each college: —

Founded		Members of the Senate	Undergraduates
1546	Trinity College	2156	700
1511	St. John's College	947	253
1348	Caius College	461	313
1347	Pembroke College	423	256
1441	King's College	455	175
1505	Christ's College	412	208
1584	Emmanuel College	375	229
1326	Clare College	309	219
1350	Trinity Hall	242	145
1496	Jesus College	215	187
1448	Queens' College	168	184
1352	Corpus Christi College	247	106
1284	St. Peter's College	217	79
1596	Sidney College	164	91
1860	Downing College	96	140
1473	St. Catharine's College	113	104
1519	Magdalene College	89	91
1582	Selwyn College	66	122
	Non-Collegiate Students	22	97
	Members not on the College Boards	154	—
		7331	3699

See England, Education in; University; and the articles on the various subjects of study, Chemistry, Greek, etc.

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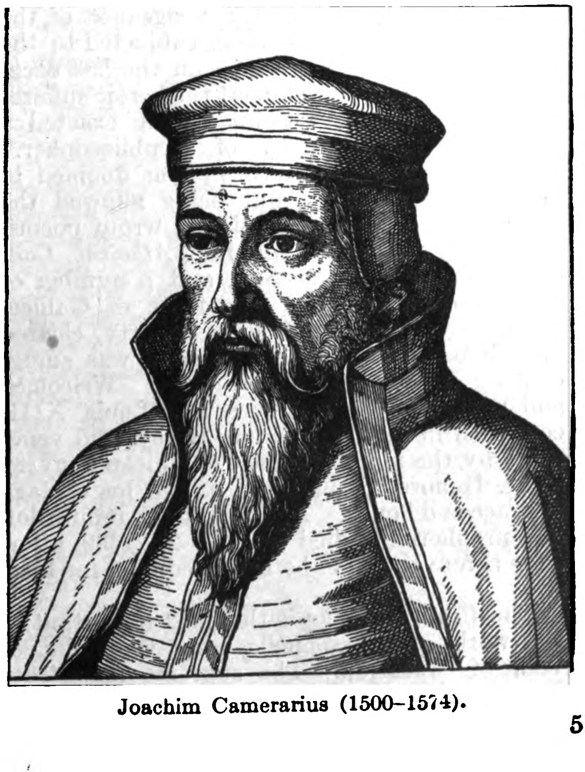
Social Life at the English Universities in the Eighteenth Century. (Cambridge, 1874.)

CAMDEN, WILLIAM (1551–1623). — An English schoolmaster and historian who was educated at Christ's Hospital and St. Paul's School and was in residence at Oxford, though he apparently left without the ordinary degrees. From 1575 to 1593 he was usher at Westminster School, and in 1593 succeeded Edward Grant as headmaster. In 1597 he published his famous *Greek Grammar,* which in the first half of the succeeding century became as much the standard textbook for Greek as Lily was for Latin grammar. In 1647, however, Camden's *Greek Grammer* was superseded by that of the famous Dr. Busby (*q.v.*). Elsewhere, however, Camden's book was retained. There had been 40 editions by 1691, and it is said altogether has run through over 100 editions. John Brinsley, in his *Ludus Literarius* (1612), says he would have scholars use Camden's Grammar for Greek, "notwithstanding the faults in the print (as indeed there are very many) and what other exceptions can be taken; because, as it is one of the shortest, as yet, so it is most answerable to our Latin Grammer, for the order of it. Whereby scholars well acquainted with our common grammar will be much helped both for speedy understanding and learning it. Also the words of art set down in it in Greek, as well as Latin, will be a great help for reading commentaries in Greek; as upon Hesiod and Homer." In 1660 Charles Hoole, in his *New Discovery of the Old Art of Teaching School,* says: "I prefer Camden's *Greek Grammar,* before any that I have yet seen, though perhaps it be not so facile or so complete as some later printed, especially those that are set out by my worthy friends, Mr. Busby of Westminster and Mr. Dugard of Merchant Taylor's School." Camden at Westminster School had to share with one other master the teaching of 120 boys, though he would use the services of monitors and the *custos*. In his time the Dean of Westminster (Launcelot Andrewes) "would send for the older boys of the school to the Deanery and teach them Greek from 8 till 11 o'clock." It must have been in the vacations (1578–1600) that Camden made his tours of antiquarian discoveries, which he eventually published in his *Britannia* (5th edition, 1600). It may reasonably be suggested that his researches into early British history must have brought an influence of a practical kind into the boys' studies. Anyway, his close interest in Westminster Abbey, the epitaphs in which building he edited in 1600; his collection of old chronicles in 1603; his *Remains concerning Britain*, 1605; his *Annales* of Queen Elizabeth's reign, published, first part 1589, second part 1628, represent the new spirit of historical research, and mark Camden as the great historian-schoolmaster of Queen Elizabeth's reign. Finally, in 1622, Camden endowed a readership in the University of Oxford for a lecturer in history, thus showing himself, educationally, a pioneer in the university teaching of history as a differentiated subject. F. W.

CAMERARIUS, JOACHIM. — The friend of Melanchthon at Wittenberg, and a prolific writer and editor of classical texts; was born at Bamberg, in 1500, died in 1574. He is interesting in the history of education as an editor of Homer, the Greek Elegiac Poets, Theocritus, Sophocles, Thucydides, Herodotus, and Aristotle's *Ethics*, *Politics*, and *Economics*, the Aristotelian editions being posthumous. His *Plautus*, edited in 1552, is an important link in the chain of the collation of classical Mss., which at length resulted in the restoration of the ancient literature to a worthy form. Camerarius wrote several works directly upon education, including a *Dialogue on the Proper Life of Boyhood*, annotations on the first and second books of Quintilian's *Institutes*, *Precepts of Honor and Behavior in Boyhood*, and a didactic work which he called the *School of the Wise*, or the *Seven Wise Men*. P. R. C.



Joachim Camerarius (1500–1574).

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CAMP SCHOOLS. — Summer camps for boys and girls constitute an interesting phase of educational development in the United States. The long summer vacation and the remarkable changes in the character of the home resulting from the growth of cities and the specialization of commerce and industry have created a need for new forms of education. The home, particularly in the city, no longer affords opportunities for boys to secure that physical, moral, and mental training that our fathers received from participation in the manifold activities which were carried on in the homes of our grandfathers. The work of the world has been removed from the home to the factory, the office, and the store, where it is being done better than ever before by specialists, each in his own class. All-round manly development demands sturdy work and manly play, each with its own special contribution of moral power, physical vigor and experience in social relations. The summer camp supplements the city school and the home by furnishing certain educational advantages, which the home no longer affords, and the city school cannot provide in adequate measure. In the summer camps, which are usually conducted for from 4 to 10 weeks, the boy has the companionship of boys of his own age, and of men of strong character who understand boys; he lives a simple outdoor life in close touch with nature; he develops his latent powers for inventing and making things; he acquires valuable physical accomplishments in land and water sports; and, through intimate social relations, learns how to play, work, and live with others.

In some of the summer camps regular instruction in school subjects is given, mainly to assist boys who have failed of promotion in school or who wish to prepare for the September college entrance examinations. Study is usually limited to 3 or 4 hours a day, the rest of the time being devoted to outdoor physical activities. In other camps there is no formal study of school subjects, but instruction is provided in nature study, manual training, photography, music, etc., besides the usual activities in land and water sports. In addition to the formal instruction, summer camps afford valuable training in health habits, discipline, and self-reliance. The boys sleep in tents, eat simple wholesome food, exercise, play, and rest under the most favorable conditions for health and normal development. Habits of order and self-reliance are fostered by compelling each boy to make his own bed, keep his clothing and belongings in order for daily inspection, and perform simple duties, such as waiting on table, gathering wood for the camp fires, etc. There are camps for all classes of boys. The camps for the children of wealthy parents are owned and conducted by private individuals, the tuition ranging from $10 to $25 a week. Other camps are conducted by philanthropic institutions like the Young Men's Christian Association, Institutional Churches, and City Settlements. In these camps the tuition ranges from $3 to $8 a week, and there are some camps for very poor boys where no charge is made, even for transportation to and from the camp.

The beginning of this movement dates back to about 1885. In 1900 there were about 100 camps, with a membership of between four and five thousand boys. During the last 10 years the movement has developed with great rapidity. It is estimated that in 1910 there were seven or eight hundred camps, with an enrollment of about 40,000 boys. Since 1900 summer camps have been organized for girls on the same general plan as the camps for boys. In 1910 there were more than 100 camps for girls, with a membership of about 5000 girls.

See EXCURSIONS, SCHOOL. G. L. M.

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CAMPAN, MME. JEAN-LOUISE-HENRIETTE GENEST (1752–1822). — Lady-in-waiting to Marie Antoinette, and friend of Napoleon; one of the few women that deserve a place in French educational history. Her reputation as a teacher, as head of the Institut Saint-Germain, led Napoleon to appoint her directress of the school at Ecouen, which was founded for the daughters and sisters of the members of the Legion of Honor. She was persecuted most cruelly by the Bourbons on account of her indirect relationship to Marshal Ney. She maintained that the punishment of the child should be proportional to the offense, and should not be too often repeated. She was one of the first to speak seriously of the education of women, enlarging its scope from the elements of reading and writing so as to include history, geography, arithmetic, elementary science, and especially modern languages, not only for reading, but also for a speaking knowledge. Among her writings are *De l'éducation; Conseils aux jeunes filles; Théâtre pour les jeunes personnes; Quelques essais de morale.* F. E. F.

CAMPANELLA, THOMAS.— Student, poet, and reformer, born in the village of Stegnano, a small town on the coast of Calabria, in 1568. Though of humble birth, at the age of 5 he impressed all who saw him by his prodigious abilities, memory, and imaginativeness; and at 13 he was already an ardent student and a poet. He soon mastered all the known sciences, and even entered upon the study of the occult branches in which the Hebrews excelled, alchemy, astrology, and magic. But the scholastic philosophy did not satisfy his spirit. "We," he wrote, "with our souls attached to dead books and temples, prefer these to the divine book of nature, to which through trouble, strife, ignorance, grief, and fatigue we should return through the knowledge of God." At the age of 30 Campanella began to apply his principles in the sphere of politics and religion, by encouraging the people of Calabria to a revolt against the dominance of the Spaniards and the order of the Jesuits. Betrayed, captured, and delivered to the vengeance of the Spaniards, he was seven times subjected to the most extreme tortures, which on the last occasion endured 40 hours and left the heroic sufferer apparently lifeless, without having exacted a single word "unworthy of a philosopher." Having conquered torture, he was doomed to permanent seclusion; but being allowed the use of paper, pens, and ink, he wrote poems, pleas for unhappy Calabria, *Atheism Conquered*, the *City of the Sun*, and a number of other works, including a defense of Galileo. After 26 years he received his liberty, cleared himself before the Inquisition, and was smuggled by friendly aid into France. Welcomed and pensioned by Richelieu and Louis XIII, consulted in matters of state policy, and venerated by the monks of the Dominican convent of St. Honore, Campanella passed his old age in peace and honor. He enjoyed the reputation of a prophet, and died on May 21, 1639, a few days before the time he had predicted for himself.

The *City of the Sun* is the most important of the works of Campanella from the point of view of education. The supreme magistrate is a grand metaphysician who is most skilled in the knowledge of the city, and who must retire if at any time another is found to have more knowledge than he. The magistrates act under his advice. Instruction is said to be the best guarantee of capacity, and the people of the sun have a higher degree of instruction than Europeans. Universal knowledge is possible to them, because they disdain scholasticism, and behold on the walls of the great central temple the representation of all human knowledge. Each act is with them a scientific step, and accordingly they learn in a single year what human beings may in ten. The three chief assistant magistrates are chosen as the most skilled in the several departments of the arts over which they are to preside; and lesser magistrates are to be elected on the same principle.

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CAMPBELL, ALEXANDER (1786–1866). — An educator who attended schools of Ireland and the University of Glasgow. For several years he was principal of an academy at Buffalo. He was the founder and the first president of Bethany College (1841–1866). Campbell was the founder of the sect known as the "Disciples of Christ" or the "Campbellites." In 1823 he established the *Christian Baptist*, a periodical which under the title of the *Millennial Harbinger* continued to appear until 1866. Campbell was the author of several doctrinal works, a number of hymns, a translation of the New Testament, and *Memoirs of Thomas Campbell*, his father (1861). W. S. M.

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CAMPBELL COLLEGE, HOLTON, KANS. — A coeducational institution formed in 1903 by the amalgamation of Lane University, Lecompton, Kans., and Campbell University, Holton, Kans. It is under the auspices of the United Brethren Church. Academic, collegiate, educational, musical, and business departments are maintained. The work of the college is based on about 12 points of a high school course. Students are admitted on graduation from an accredited high school. Degrees are conferred in the college and educational departments. There are 6 professors and 9 instructors and assistants on the faculty.

CAMPBELL-HAGERMANN COLLEGE, LEXINGTON, KY. — A proprietary school for girls and young women. Preparatory, collegiate, fine arts, domestic science, and business departments are maintained. English and classical courses are offered, on the completion of which diplomas are conferred. There is a faculty of 22 instructors.

CAMPBELL, WILLIAM HENRY (1808–1890). — Educator, studied at Dickinson College and Princeton. He was principal of Erasmus Hall (1833–1839); principal of Albany Academy (1848–1851); professor of moral philosophy in Rutgers College (1851–1862), and president of that institution from 1863 to 1882. Author of *System of Catechetical Instruction*, and of several religious works. W. S. M.

CAMPE, JOACHIM HEINRICH (1746–1818). — One of the best known representatives of the Philanthropinist movement, author of many books for children, German lexicographer. He was born at Deensen in Brunswick, and studied theology at the University of Halle. In 1777 he was called to the charge of the Dessau "Philanthropinum," which had been nearly ruined by the erratic management of its founder, Basedow (*q.v.*). Unable to agree with Basedow, he left rather precipitously after a few months, and established an educational institute of his own at Triton, near Hamburg. From there he went (1786) as "Councillor of Education" to Brunswick, where Duke Karl Wilhelm Ferdinand attempted to make the school system independent of the Church. Owing to the opposition of the clergy, the plan failed, and from 1790 on Campe devoted himself to a very prolific literary activity, especially in the field of juvenile writings. His most popular work was *Robinson der Jüngere* (1779), based on Defoe's story, but interspersed with numerous remarks of commonplace morality which are exceedingly tedious. His most important educational work is his *Allgemeine Revision des gesamten Schul- und Erziehungswesens* (*General Revision of the Whole System of Schools and of Education*), a pedagogical journal in 16 volumes (1785–1791), in which he published translations of the works of Locke and of Rousseau, besides numerous original articles by himself and other adherents of the Philanthropinist school. In his *Dictionary of the German Language* (5 vols., 1807–1812) he tried to introduce native equivalents for many of the foreign words which had gradually crept into German. Some of the new words created by him have become firmly established in the language.

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CANADA, EDUCATION IN. — Historical Development. — By the British North America Act of 1867 the control of public education was left to the governments of the four provinces (Ontario, Quebec, Nova Scotia, and New Brunswick) which were then united under the general name of Dominion of Canada. The same right has been assured also to the provinces that have since entered the confederation (Prince Edward Island, Manitoba, British Columbia, and the Provinces of Alberta and Saskatchewan, formerly included in the Northwest Territories. Prior, however, to the federation, education had become a matter of general interest. Ontario, " the core of the confederation," had at the time of its adoption a well-organized system of public schools. Quebec had brought its parochial schools under public supervision, and the smaller maritime provinces had proved their interest in the cause both by legislation and by grants for schools from public funds. From the beginning two forces were at work directing the educational activities of the people. Both the English and French settlers brought with them traditional respect for parochial schools and for ecclesiastical control of education; but the English settlers, of whom many came from the United States after the Declaration of Independence, were also imbued with the idea of public responsibility in this matter. Before the union of the two older provinces, which took place in 1841, the legislature of Upper Canada had passed measures providing for the establishment of township " common schools " and of district grammar schools of the English type, throughout the province. The need of higher seats of learning was also recognized, and as early as 1797 a grant of 500,000 acres of land was secured as an original endowment for a university and secondary schools. In 1821 a royal charter was obtained authorizing the establishment at or near York (now Toronto) of a college " with the style and privilege of a university." The institution was organized and the erection of the college buildings begun in 1842; the next year the first class of students matriculated. An equal regard for the higher learning was shown in the province of Lower Canada, where the Church directed the educational work. Laval University was founded by the Seminary of Quebec (ecclesiastical body) in 1852, and the same year a royal charter was granted to the institution. These institutions fixed the standards for the colleges and seminaries which multiplied around them, and gave leaders of learning and ability to the cause of popular education. In the opening address before the first Parliament of the united provinces, which convened in 1841, the Governor-General emphasized the need of adequate provision for public instruction. A school law for the United Provinces was passed the same year, which, although it proved futile, served to settle the policy of provincial independence in school affairs.

The Ontario System of Public Instruction. — In 1843 measures were adopted looking to the organization of the elementary schools of Upper Canada (now Ontario), and in 1846 the Common School Act for that division was passed, upon which is based the system of elementary education for which the province is distinguished. This Act was inspired by Dr. Egerton Ryerson, who had been appointed Chief Superintendent of Education in 1844 and had made careful study of European systems of education and those of Massachusetts and New York. The measure, therefore, embodied the best elements of several systems, to which were added a number of important original features. Dr. Ryerson held his official position for 30 years, and thus was able to develop and perfect the work of which he was founder. The Ontario school law of 1871, passed 4 years after the Dominion federation was formed, embodied the principles upon which Dr. Ryerson had steadily insisted, viz., free tuition, compulsory education of children of school age, county inspection by qualified persons, and uniform examinations for promotion from elementary to high schools.

Central Authority. — In 1876 the office of chief superintendent was abolished, and its duties transferred to a Minister of Education, who included within his province all the public agencies of education. Thus, the " common " or " public schools " were brought into closer relation with the secondary schools and higher institutions, although they continued to be separately administered. As a member of the government council, the Minister's powers greatly exceed those formerly devolved upon the Superintendent. He initiates and largely directs school legislation. His annual report to the Lieutenant-Governor comprises all the public agencies of education and such statements and suggestions for promoting the interest, generally, as he may deem useful and expedient. He has power to decide upon all disputes and complaints laid before him, the settlement of which is not otherwise provided by law, and upon all appeals made to him from decisions of subordinate school officers. The education department includes the minister's official staff, professional assistants, advisers, and special inspectors, all selected with regard to their professional competency. The ever-increasing scope and complexity of the system is indicated by the development of the department. The most recent illustrations of this growth are the creation in 1906 of an Advisory Council of Education, comprising representatives of the universities, of the various classes of public schools, of the inspectorate and local trustees; and the appointment of a superintendent who acts as the minister's representative in the council. The incumbent of this office is necessarily an educational specialist, his duties being not executive, but advisory. The department comprises within its province: kindergartens, public schools, and night schools, high schools, and collegiate institutions pertaining to secondary education, and special schools for training teachers, artisans, etc.

Local Authorities. — The municipal system of Ontario affords an admirable basis for the local control of school affairs. The province is divided into counties, which are subdivided into minor municipalities. These are townships, which for school matters are subdivided into sections, and incorporated villages, towns, and cities. The responsibilities and privileges of each of these divisions, as regards education, are clearly defined by law. They are exercised through school trustees elected by the ratepayers (men and women) of the respective communities. The public or common schools based upon the laws of 1846, 1871, and subsequent measures, and the complementary high schools and collegiate institutes as provided for by the High Schools Act of 1885, form together a unified system of public education leading up to the university matriculation. The system is marked by the judicious balancing of central and local control. The central authority determines the scholastic standards by official requirements; the local authorities establish schools, appoint teachers and inspectors, regulate expenditures, etc., but are governed at every step by the ministerial mandate. Thus are secured equality of provision and uniform standards throughout the province, professional training to some degree for all teachers, careful adjustments of courses of study, uniform textbooks, and an inspection service, strictly professional in its personnel.

The Public Schools. — The establishment of the "common" or "public" schools is mandatory upon the local school boards, which must meet certain prescribed conditions as regards sites, buildings, and equipment; for instance, in the case of rural schools, the building must be at least 30 feet from the public highway; where the average attendance of the section for the previous year exceeds 50, the schoolhouse must contain 2 rooms, an additional room and teacher being required for each additional 50 pupils in average attendance; there must also be separate entrances with covered porches and suitable cloakrooms for boys and girls. Conditions as to lighting, heating, sanitation are all included in the official requirements. The schools are classified or graded in 5 forms, promotions being made twice a year. Examinations conducted by the teachers determine in part the fitness of the pupil for promotion; but the record of his class work has greater weight in this respect. The official program, which is followed by all schools, includes reading and literature, geography, grammar and composition, history, arithmetic, writing, drawing, temperance and hygiene, music, drill and calisthenics, moral and religious instruction; in the fourth form agriculture is introduced. The fifth form was intended as a sort of high grade division in rural schools, and from it has developed a system of continuation classes or schools which have rapidly increased since 1905. The purpose of the Department in fostering these classes is not to serve the particular interests of the rural population as opposed to other sections, but to meet the larger interests of the State as a whole while contributing to the best development of the individual pupil. The complete plan for the continuation schools includes: (1) a fixed course for general culture; (2) an elementary course in agriculture or allied subjects; (3) a course in the economics of the home. Two teachers are really required to carry on the work, but at present, as a rule, only one teacher is engaged in each school for the special duties of the continuation class. These classes, or schools, if organized as such, are under the charge of a special inspector. They are carefully distinguished from the regular high schools, and the law prescribes that they shall not be opened within the high school districts.

Separate Schools. — The law provides that any number of heads of families, not less than five, residents of the place and Roman Catholics, may unite and establish a separate school. Supporters of such schools are exempt from the payment of local taxes for the support of the public schools. The separate schools are all under government inspection, and are generally conducted in accordance with the same regulations as the public schools. Like the latter, they are managed by boards of trustees, who are elected by the separate school supporters. The teachers, except those who are members of certain religious orders, are required to comply with the official regulations in order to receive certificates. The course of study pursued by the pupils is nearly the same as that for the public schools, and the textbooks, except those for religious instruction, are in many instances the same. The provision as to separate schools applies to Protestants and to colored persons as well as to Roman Catholics; but as a rule only the latter avail themselves of the privilege. Efforts have been made from time to time to do away with this feature by the establishment of a system of purely secular schools; but this purpose has little popular support, and nonsectarian religious exercises, *i.e.* selected Bible readings and the Lord's Prayer, are required in all public schools.

Compulsory School Attendance. — The law not only requires the establishment of public schools by local authorities, but obliges parents and guardians to secure the education of the children under their charge, between the ages of 8 and 14 years, either by public or private agencies. The legal school age, it may be observed, is longer, *i.e.* 7 to 21 years. Children are required to conform to the rules and discipline of the school, and vicious or incorrigible children are remanded to industrial schools. The compulsory school provision is supplemented by labor laws which forbid the employment of children under 14 years of age with penalties for violation of the same. The conditions under which exemption from school attendance may be granted are carefully defined. Truant officers must be appointed for every city, town, and incorporated village, and may be appointed for every school section. These officers are invested with public powers and large authority for the investigation of truant cases. As a consequence the compulsory law is well enforced in the cities; in the rural sections, in Ontario as elsewhere, it is little regarded.

The Legislative Grant. — The apportionment of the legislative grant to public schools is made with special reference to stimulating local support. Formerly the grant to each school was based upon the average attendance of pupils. Under legislative acts of 1907 the grant to rural public and separate schools is apportioned on the basis of the salaries paid to teachers, the value of the equipment, the character of the accommodations, the grade of the teachers' professional certificates, and the amount of the local expenditure. Special grants are also payable to schools in new or poor districts. To meet the increased expenditure thus incurred the grant for rural schools in 1907 was raised to $380,000, as against $120,000 in 1906. The grants to schools in urban municipalities are apportioned as heretofore on the basis of the average attendance of pupils for the previous year. County and township authorities are required to make additional grants up to a specified minimum for each school, and local taxes supply whatever may be required to make up the remaining expenditure. The effort for improving the conditions of rural education by the changed basis and increased amount of the usual legislative grant is supplemented by a special grant of $5000 made in aid of libraries for the rural schools. The increased grants for continuation classes, and for the encouragement of school gardens, although applicable also to cities, are specially helpful in the rural communities.

The Professional Guarantees. — In respect to the two main conditions of an efficient school system, namely, qualified teachers and competent inspectors, the Ontario system is unrivaled. No person can enter the service who does not hold a government certificate, and no teacher secures a permanent certificate "who does not possess qualifications of a threefold nature: (1) scholarship, (2) a knowledge of pedagogical principles, and (3) success shown by actual experience."

Training of Teachers. — Provision for training teachers is afforded by kindergarten training classes; county model schools; normal schools; teachers' institutes, and university faculties of education.

The County Model School. — In each county one public school, at least, is set apart by the Education Department for the purpose of training intending teachers for the third or lowest grade certificate. The training covers a session of 4 months, and each school receives a grant of $150 from the legislature and an additional $150 from the county council to insure an adequate staff for the work. This provision is regarded as a purely temporary expedient, but it has saved the rural schools of Ontario from the evil of totally incompetent teachers. Every effort is made, however, to provide normal schools, even in the remote and newly settled portions of the country. Two normal schools, with large model or practice schools as adjuncts, were early established, one in Toronto and the other in Ottawa. Four additional normal schools have recently been organized, and 2 others have been provided for. The course of the model schools is the same as that of the ordinary public schools. The course of instruction in the normal schools is strictly professional, including history of education; science of education; school organization and management; methods of teaching each subject on the program of the public schools; practice in managing classes and in teaching in the model school; also instruction in the special subjects of the public school course, such as temperance and hygiene, agriculture, etc. In order to obtain a permanent license to teach in the public schools, a teacher must hold a second-class certificate, which is awarded only to students who have attended a regular normal school and passed the final examination. Candidates for admission to the normal school must have obtained the junior high school certificate and have had one year's experience in teaching. The highest positions in the teaching profession are open only to persons holding a certificate of qualification awarded on the results of examinations held by the university faculty of education.

The Inspectors. — School inspectors are appointed by the local authorities, but the law determines the conditions on which the inspector's certificate shall be issued. These are as follows: (*a*) 5 years' successful experience as a teacher, of which at least 3 years shall have been in public schools; and (*b*) a specialist's certificate obtained on a university examination or a degree in arts from the University of Toronto with first-class graduation honors in one or more of the recognized departments in said university, or an equivalent from any other university of Ontario, with a certificate of having passed the final examination in pedagogy. Once appointed, the inspector has a life tenure, unless he forfeits his position by misconduct or inefficiency.

High Schools and Collegiate Institutes. — The high schools of Ontario, which were organized under their present title by the law of 1871, are a development from the grammar schools of the early colonial period. With the collegiate institutes, which are high schools of an advanced type, they offer very full provision for secondary education. The province of the high schools is carefully distinguished from that of the public schools, and while the courses of study in the two form a continuous scheme of education, pupils from the public schools who wish to enter the high school, as well as all other candidates for admission, must pass an examination prescribed by the Department and uniform throughout the province. The ideal of secondary education which these schools illustrate may be inferred from their program, which is arranged for 4 forms. In forms 1 and 2, special attention is paid to reading, English grammar, composition and rhetoric, English poetical literature, modern history, especially that of Canada and the British Empire, and geography; the mathematical course includes arithmetic, algebra through simple equations of one unknown quantity, and the first book of Euclid; the sciences taken up are physics and botany; as regards languages, option is allowed between Latin, French, and German. To these branches are added drawing and what is called a commercial course, which is obligatory for all pupils. At the close of form 2, pupils may take the high school primary examination, which has special value in the business world. The studies of forms 3 and 4 are arranged with special reference to the high school leaving examination or the university matriculation examination. These examinations, therefore, determine the standard of secondary education, and the latter also regulates the course of private schools that prepare students for the university. The subjects comprised in the matriculation examination are: Latin, mathematics, English history and geography, and choice of one of the following groups: (*a*) Greek; (*b*) French and German; (*c*) French and either physics or chemistry; (*d*) German and either physics or chemistry. The high school certificate is recognized for admission to universities and various professional courses. The management of the secondary schools is intrusted to local trustees whose duties are similar to those of public school trustees. A special corps of high school inspectors is maintained by the education department. The current expenses of public secondary schools are met by (1) government grants, (2) county grants, (3) district or municipal grants, (4) fees of students. The amount of the government grant is based on the efforts made by the locality. As a minimum each high school receives a fixed grant of $375, and each collegiate institute an additional grant of $275, the grants in full varying from about $500 to $1800. The county council supplements this grant by an equal amount to each school, which is intended to meet the cost of instruction for the county pupils who do not reside in the municipality or district where the high school is situated. Tuition fees are small, and may be and often are remitted.

The practical result of the training in the commercial course of the high schools has led to the establishment of special courses in agriculture. In 1906 the experiment was made of instituting a special department of agriculture in 6 selected high schools and appointing to the charge 6 graduates of the agricultural college. In 1907 two schools were added to the original group.

Departmental Examinations. — The high school entrance examination begins the series which the department conducts as a means of maintaining scholastic standards, and at the same time of rewarding earnest students by an official diploma. In addition to the two high school certificates, primary and leaving, and teachers' certificates, there are examinations for specialists' certificates which have equal value with a university diploma.

Statistical Summary. — The number of schools of each class comprised in the Ontario system, for the latest year reported (1908), the distribution of pupils among them, and the expenditure for each class so far as the item is separately reported, are shown in the following table: —

Schools		Enrollment	Number of Teachers	Expenditure	Cost per Pupil
Class	*Number*				
Kindergartens .	156	16,477	288		
Public schools .	5869	399,670	9020	$7,182,234	$17.97
Separate Roman Catholic schools . .	465	53,551	1065	761,592	14.22
High schools and collegiate institutions .	145	31,912	795	1,385,832	43.42
Night schools .	10	889	18		
Normal schools	6	1,149	62		

The total enrollment in public and separate schools was 453,221, and the average daily attendance in the same 272,190, or 60 per cent of the enrollment. More than half the whole number of pupils, viz., 53.47 per cent, were in rural schools. Of the teachers employed in the schools named, 1842, or 18 per cent were men, as against 30 per cent in 1897. As regards certificates, it appears that 767 teachers, or 7.6 per cent, held first-class certificates; 3979, or 39.4 per cent, second-class; and 3565, or 35 per cent, third class. The small number remaining were temporary appointees. The average annual salary for men teachers in the province was $624; for women teachers, $432; the average salary in cities was for men, $1350; the highest salary $2000. The influence of the university matriculation examination is indicated by the choice of languages on the part of high school pupils. In 1909 the number taking Latin was 21,928; Greek, 680; French, 18,960; German, 4009. It is observable further that the number taking Latin has steadily increased during the decade; French and German show slight increase, and Greek slight decline.

The following tables show the progress of the schools in respect to salient conditions for the two decades 1887 to 1907: —

SCHOOL POPULATION AND ATTENDANCE

Year	School Population 5 to 21	Total Number of Enrolled Pupils in Public and Separate Schools	Percentage of Average Attendance to Total Number Enrolled
1887	611,212	493,212	49.71
1897	590,055	482,777	56.66
1907	590,285	448,218	59.45
1908	596,713	453,221	60.05

With the development of continuation schools, the growth in the enrollment of high schools and collegiate institutes, which was very marked in the decade 1887 to 1897, — *i.e.* from 17,459 to 24,390, or an increase of nearly 40 per cent, — has naturally somewhat declined; still, a normal growth is maintained, as is shown by the increase from 24,390 high school pupils in 1897 to 31,912 in 1908; a gain of 30 per cent.

RECEIPTS AND EXPENDITURES (*Public Schools Only*)

Year	Total Receipts	Total Expenditure	Cost Per Pupil
1887	$4,331,357	$3,742,104	$7.59
1897	4,988,155	4,015,670	8.73
1907	9,257,928	7,556,179	16.85
1908	9,972,181	7,943,826	17.52

The sources of the school income and the proportion from each source, for the years considered, were as follows: —

	1887 Per Cent	1897 Per Cent	1907 Per Cent	1908 Per Cent
Legislative grants . . .	6.2	7.3	7.07	7.7
Municipal grants and taxes	71.2	67.1	66.4	66.
Other local sources . .	22.6	25.6	26.53	26.3

Rural versus City Schools. — The very complete provision for supervision and inspection by the central department has brought the rural schools of Ontario to a comparatively high standard. At the same time the highest possibilities of the system are realized in populous centers. In Toronto, for example, a city of 208,000 inhabitants, the legal requirements of the system are not only fully met, but they are often anticipated by the action of the local school board, which, it may be said, sets the pace for the province. The school provision is very complete, and comprises the entire range of institutions from kindergarten to high schools, classical and technical. The teachers are well trained, and the system is maintained at a high degree of efficiency through the devotion and energy of the chief inspector, a position long held by Mr. James L. Hughes, who has achieved wide reputation as an educational leader. The official staff of the board includes also an assistant inspector and a senior high school principal whose experience is utilized in the adjustment of courses of study. The current expenditure for the maintenance of the city schools in 1908 amounted to $853,230, equivalent to $32.23 per capita of average attendance.

Quebec, System of Education. — The public school system of Quebec had its origin in parochial schools and schools maintained by the religious orders, the Jesuits, Recollets, Christian Brothers, etc., from the time of the earliest settlement of the colony. The basis of the system was laid in 1845 by a law which made the parish the unit of school administration. Government inspectors of schools were appointed in 1852, and in 1859 the form of an organized system was completed by the appointment of a council of public instruction. This council, which has general charge of the dual system of Catholic and Protestant schools, as provided for by a law of 1875, comprises: (1) The Roman Catholic bishops or administrators of the dioceses in the province, and an equal number of Roman Catholic laymen appointed by the Lieutenant Governor in council; (2) a committee of Protestant members appointed in like manner. The two committees sit separately, and administer the affairs of the Catholic and Protestant schools respectively. The superintendent of public instruction appointed by the Governor is *ex-officio* chairman of the joint council of public instruction, but is entitled to vote only on the committee to which he by religion belongs. Each committee makes its own list of textbooks, and all regulations for the course of instruction in its own schools; and on the presentation of the two committees the Lieutenant Governor is bound to appoint Catholic and Protestant inspectors to visit the several schools. The proceeds of the special tax, of the general public school fund, and of any legacies which may be bequeathed for the purpose of education, are divided between the two committees in the proportion of the number of Catholic and of Protestant inhabitants. In regard to the special tax of one fifth of a cent per dollar, Catholic and Protestant ratepayers may elect to which fund their contributions shall be paid. The statutes of the province contain provisions allowing dissentients in any district, if of sufficient number, to demand a school of a religious character different from that of the majority of the inhabitants; but practically it is found that the two classes of schools satisfy the wants of the inhabitants, and that no private schools exist outside the general system of public instruction. In the Catholic schools the catechism is taught. In the Protestant schools the Bible is the textbook for religious instruction. Scripture history is taught, and the school exercises begin with the reading of the Scriptures and prayer.

A few of the rural schools are mixed, but in them religious instruction is generally given in accordance with the views of the majority, the children of the minority being exempted from the obligation to attend the religious lesson.

Local Authorities. — The local unit of school administration in Quebec is a school municipality, *i.e.* " any territory erected into a municipality for the support of schools under the control of school commissioners or of trustees elected by those who pay a property tax (ratepayers)." The commissioners are empowered to divide a municipality into school districts and to maintain one or two schools in each district. The commissioners, or trustees, elected as provided above constitute what is technically termed a school corporation. These officers have full control of the public schools in their respective areas, subject only to the general requirements of the council. They engage the teachers, determine their salaries, provide the schoolhouses and equipments, and in general discharge the same duties as the school trustees of Ontario. The separation of the schools in each district by religious differences completes the policy begun by the division of the central council into two autonomous committees.

Classification of Schools. — In addition to the schools under control, that is, schools in charge of the elected school commissioners or trustees of each municipality, there are many Roman Catholic schools, in charge of the clergy or of the religious orders, characterized as independent or partly independent schools, which receive grants either from provincial or from local funds. The public schools of Quebec, whether Roman Catholic or Protestant, are distinguished as elementary schools comprising five grades, model schools, and academies. The Roman Catholic model schools and academies do not include the classics in their course, these studies being reserved for classical colleges founded and maintained for the most part by the Church or by the religious orders; the Protestant model schools and academies include courses in Latin and Greek.

In general it may be said that the schools under the charge of the Protestant committee are similar in their classification and conduct to the public schools of the other provinces. In the system under the charge of the Catholic committee, the tendency is to draw sharper distinctions between schools for the children of the poorer classes and those that will naturally attract the patronage of men in business and professional life. On the other hand, it should be remembered that the clerical teaching orders, especially the Christian Brothers, have always paid great attention to the industrial training of the young, combining it with the instruction in elementary branches. Thus the recent effort for promoting manual training and gardening through the agency of elementary schools accords with the traditions of Catholic educators. What was formerly done in a few schools is simply becoming general under the new impulse. The inspector of horticulture in primary schools under the Catholic committee reports that while in 1907 gardening was carried on in 20 counties and 60 schools in respect to 1258 pupils, in 1908 it was extended to 27 counties, 97 schools, and 2200 pupils. It is worthy of note, also, that of the total pupils in the Catholic elementary and model schools and academies, 94 per cent are French; whereas in the corresponding schools under the Protestant committee, 95 per cent of the pupils are of English origin. In many schools both languages are employed as media of instruction. The Catholic model schools have, as a rule, preparatory departments for the elementary instruction of pupils who will presumably continue their education up to 16 or 18 years of age. The model school course is continuous with that of the academies. Many of the classical colleges also have preparatory divisions. For these reasons a classification of the schools of Quebec on the basis of grades is quite misleading.

Training and Qualifications of Teachers. — Besides the schools above enumerated, the law makes provision for the establishment of one or more normal schools with attached model or practice schools. Boards of Examiners appointed by the Lieutenant-Governor upon the recommendation of either committee of the Council of Public Instruction are authorized to examine candidates for teachers' positions and to issue diplomas to those who pass the tests. The examining boards for Montreal and Quebec are provided for by special statutes.

Sources of Support. — The support of the various classes of schools comprised in the system is derived from legislative grants, local taxes, and fees. The fees are low, not exceeding 50 cents a month, and they may be and often are remitted.

Montreal as a Type. — The system has in it elements of friction as well as of power, both of which are most active in the cities. Montreal, with a population of 268,000, has practically a triple system of schools, *i.e.* public schools under the Protestant board, public schools under the Catholic board, and subsidized private schools. The Protestant schools, which in 1908 enrolled 11,956 pupils, including 508 in kindergartens and 1431 in the 3 high schools, resemble schools of the United States. The enrollment in the Catholic schools the same year was 27,154, of whom 5858 were in private subsidized institutions. The teaching force numbered 822, of whom 411 were members of religious orders for women and 196 of religious orders for men. The total expenditure on the part of the Catholic school board was $373,050, of which $43,250 were supplied by fees. These particulars indicate the deep distinction between the two parts of the dual system; the one wholly modern in its spirit and aims; the other freighted with ecclesiastical traditions.

Statistical Summary. — In 1907–1908, the latest year covered by an official report, there were 210,543 pupils enrolled in elementary schools; 97,032 in model schools; 45,369 in academies; total, 352,944. Of this number 88 per cent were in schools under Catholic control. The number of teachers in the schools was 11,774, of whom 10,830 were in the Catholic schools. The latter included: lay teachers, 264 men, 5369 women; and clerical teachers, 1831 men, 3366 women. Of the total number of Catholic lay teachers, 4713 had obtained a teacher's diploma. The Protestant teachers numbered 1173, viz. 34 men, 1139 women. Of these teachers 23 men and 725 women had secured diplomas. In addition to the abovenamed schools, corresponding to the public and high schools of Ontario, there were reported under the head of special schools, 11 schools of arts and manufactures, 4 schools for defectives, and 62 night schools, with a total attendance of 9352 pupils; 4 normal schools, with 526 students in training, and 699 pupils in the attached model schools. The classical colleges subsidized by the State numbered 19, with 6274 pupils, of whom the majority were preparing for matriculation at some one of the universities. The total expenditure for this system of schools and colleges was $5,148,887, which was derived as follows: Provincial appropriation, $683,350, or 13.2 per cent; local taxes, $2,624,438, at 51 per cent; fees, chiefly in subsidized institutions, $1,841,099, or 35.8 per cent.

Other Provincial Systems. — Apart from the great interest which the Ontario system of public and high schools has excited by its completeness and results, it is of importance because it has served as a model for the other provinces, Quebec alone excepted, in the development of their systems. All the provinces have sought to secure uniformity of school provision and educational standards by means of government control; but no other province has invested the chief officer of education with such extensive powers as those exercised by the head of the Ontario system. In Nova Scotia, British Columbia, and Manitoba the central educational authority is the Executive Council of the respective province. The chief officer of education in each, who is appointed by the provincial Governor, bears the title of Superintendent. The central control of public education in New Brunswick is vested in a Board of Education, comprising the Lieutenant Governor, the members of the Executive Council, the president of the University of New Brunswick, and the chief superintendent of education. The last named is the secretary and chief executive officer of the board. The local control of school affairs in all the provinces is vested in elected boards of trustees.

An interesting feature of the local organization in Nova Scotia is the annual school meeting in each rural school section, which the law requires to be held on the last Monday of June, just before the close of the schools for the year, and 7 or 8 weeks, or more, before the opening of the schools in the new school year. It is the annual parliament of the section, where the taxpayers assemble to discuss the educational administration, elect the new trustees, and vote the amount of supply to be levied upon the section for the support of the schools for the following year.

Nova Scotia, British Columbia, and Prince Edward Island, in common with Ontario, have compulsory school laws. Separate schools for Roman Catholics are provided in the recently formed provinces, Alberta and Saskatchewan. The public schools of all the provinces excepting Quebec are free schools, their support being derived from provincial grants, local (municipal) appropriations, and school taxes. While the mode of appropriating the legislative grant among the school districts differs in the different provinces, the principle is generally followed of making the grant a means of stimulating local effort in behalf of the schools. In determining the basis of distribution, the tendency is to pay increased regard to the grade of certificate or license held by the teachers and to the length of the school session.

The Manitoba Law of 1890. — Prior to the passage of the education law of 1890 Manitoba maintained separate schools for Roman Catholic and for Protestant children. The bitter contest to which this law gave rise, the appeal to the Dominion government, and subsequently to the English Privy Council, the remedial order issued by the Dominion government, and the refusal of the Manitoba people to submit to this dictation, recall the struggle over the same question which from time to time agitated Ontario until the passage of the Separate School Act of 1863. On account of the contest over the question in Manitoba, the provisions of the law of 1890 are of unusual interest. The general control of schools was vested in a Department of Education, consisting of the Executive Council, or a committee thereof, appointed by the Lieutenant Governor in council, and an Advisory Board composed of 7 members, 4 of whom are appointed by the Department of Education, 2 by the teachers of the province, and 1 by the university council. Among the duties of the Advisory Board is the power "to examine and authorize textbooks and books of reference for the use of the pupils and school libraries; to determine the qualifications of teachers and inspectors for high and public schools; to appoint examiners for the purpose of preparing examination papers; to prescribe the form of religious exercises to be used in schools." The law provides "for the formation, alteration, and union of school districts in rural municipalities, and in cities, towns, and villages"; for the election of trustees in each district; for the maintenance and control of the schools. It is further ordered that:—

> All public schools shall be free schools, and every person in rural municipalities between the age of 5 and 16 years, and in cities, towns, and villages between the age of 6 and 16, shall have the right to attend some school.
>
> SEC. 6. Religious exercises in public schools shall be conducted according to the regulations of the advisory board. The time for such religious exercises shall be just before the closing hour in the afternoon. In case the parent or guardian of any pupil notifies the teacher that he does not wish such pupil to attend such religious exercises, then such pupil shall be dismissed before such religious exercises take place.
>
> SEC. 7. Religious exercises shall be held in a public school entirely at the option of the school trustees for the district, and upon receiving written authority from the trustees it shall be the duty of the teacher to hold such religious exercises.
>
> SEC. 8. The public schools shall be entirely non-sectarian, and no religious exercises shall be allowed therein except as above provided.

General Statistical Survey. — The following tables bring into comparative view the principal data pertaining to the several systems of the Dominion.

STATISTICS OF PROVINCIAL NORMAL SCHOOLS — 1908

PROVINCE	NUMBER OF SCHOOLS	NUMBER OF STUDENTS		
		Men	*Women*	*Total*
Ontario	6	128	1021	1149
Quebec	7	400	518	918
Nova Scotia	1	—	—	161
New Brunswick	1	45	304	349
Manitoba	5	—	—	131
British Columbia	1	—	—	45
Prince Edward Island	1	—	—	285
Alberta	1	44	96	140
Saskatchewan	1	39	92	131

PROVINCES	AVERAGE ANNUAL SALARIES OF TEACHERS	
	Male	*Female*
Ontario	$624	$432
Quebec	289	167
Nova Scotia	[1] 218–924	[1] 194–598
New Brunswick	[1] 262–641	[1] 218–395
Manitoba	590	
Prince Edward Island	[1] 154–460	[1] 151–281
Alberta	[1] 635–899	[1] 625–696

[1] The average salary in these provinces is given in the official reports for each class of teachers. The amounts tabulated are the highest and lowest averages reported.

STATISTICS OF PUBLIC ELEMENTARY AND HIGH SCHOOLS IN THE SEVERAL PROVINCES

PROVINCE	AGES FOR SCHOOL ATTENDANCE		DATE OF SCHOOL STATISTICS	ENROLLMENT	TEACHERS	EXPENDITURE		
	Legal	*Compulsory*				*Total*	*Per Capita of Enrollment*	*Per Capita of Population (1901)*
Ontario	5–21	8–14	1908	485,133	10,878	$9,329,658	$19.23	$4.26
Quebec	5–16		1907–8	352,944	11,774	$4,465,537	12.65	2.70
Nova Scotia	5–15	7–12	1908	100,105	2,264	1,243,697	12.42	2.70
New Brunswick	5–15		1908–9	67,785	1,942	829,709	12.24	2.55
Manitoba	5–21		1908	71,031	2,526	1,902,733	26.78	7.45
British Columbia	5–16	7–12	1908–9	36,098	911	[1] 1,220,510	36.73	6.85
Prince Edward Island		8–13	1909	18,073	595	183,206	9.43	1.77
Alberta			1908	39,653	1,468	[2] 879,719	23.19	4.07
Saskatchewan			1906	31,275	1,298	1,031,217	32.97	4.01
Northwest Territories	5–16	7–12	1905	25,191	1,011	1,002,876	39.89	

[1] The total expenditure including permanent works was $1,547,700.
[2] Total expenditure including purchase of sites, erection of buildings, etc., $2,636,835.

Special Schools. — In addition to the elementary, high, and normal schools, all the provinces maintain special schools for deaf mutes and for those deprived of sight, on the principle that the State owes such children equal facilities with those provided for normal children. The courses of instruction in these institutions are analogous, so far as the capacity of the pupils will allow, to those of the elementary schools. The industrial departments are well equipped and the training carefully adapted to the aptitudes of the pupils.

Movement for Manual Training and Rural Education. — The Macdonald movement, pertaining to both manual training and rural education, affects every province of Canada.

It dates from 1899, when Sir William C. Macdonald furnished funds to establish manual training centers in connection with the public schools in 21 places from Prince Edward Island to British Columbia, and to maintain them without cost to the pupils or the public for a period, in most cases, of 3 years. At first special teachers of ability and experience were brought in from outside, mostly from England. Some 27 manual training teachers were thus secured. As time went on Canadian teachers were trained and became duly qualified. Before the end of the period of maintenance by the Macdonald fund, there were 45 manual training teachers on the salary roll at a cost of some $3600 per month, and more than 7000 boys were taking the courses. As a rule the work thus begun was taken over by the education authorities when the initial period closed, and in such cases the equipment was presented free to the school boards, and in the case of the normal schools to the provincial governments. In 1907 over 20,000 boys and girls in Canadian schools were receiving the benefits of manual training in their regular course under the school authorities. The Macdonald rural school fund made provision for a school garden at each of 5 rural schools in each of 5 provinces. A trained instructor was placed in charge of each group of 5 gardens and of the nature-study work at them, the expenses being met from the fund. The educational purpose has been kept clearly in view in the conduct of the gardens. They are attached to the ordinary rural schools, owned by the school corporations, and conducted under the authority of the school trustees and with the express approval of the ratepayers. The work is recognized as a legitimate part of the school program, and it is interwoven as far as possible with other studies. The garden is merely an outer classroom of the school. This relation has been in good part established by the traveling instructors whom Professor Robertson appointed to supervise the work in each province. The instructors were chosen as teachers of experience in rural schools, and were sent for special preparation, at the expense of the Macdonald fund, to Chicago, Cornell, Columbia, and Clark universities in the United States, and to the Ontario Agricultural College, Guelph. The movement, which has thus progressed on two distinct lines, is intended to bring the education provided for the people at public expense into more immediate relation to the industrial demands which they must meet when the period of school training is closed. The work is passing now from the experimental stage to that of an integral part of the general scheme of education. Marked advance has been made in this respect in New Brunswick, Nova Scotia, and Ontario. The first-named province presents several examples of consolidated rural schools with admirable equipment for both manual training and garden culture. In Nova Scotia manual training centers have been organized both in cities and rural districts which are attended for 2 hours a day by pupils on the public school registers of their respective sections. The schools are divided into two groups, mechanic science and domestic science. In 1908 the former were attended by 1824 pupils, and the latter by 1610, or a total of 3434.

In Ontario the entire scheme of technical education, including manual training, household science, and art instruction, is under the direction of a special inspector on the official staff of the Education Department. This officer has made an exhaustive study of the industries of the province with a view to adapting the technical training to the actual conditions surrounding the pupils. After the preliminary training in manual work and drawing in the lower grades of the public schools, he advises that a system of vocational training be organized parallel with the last 2 years of the public school course and the high school course, as a means of fitting the boys industrially inclined for entrance upon the trades of their respective localities. The permanency of the work is assured by the provision of two centers amply equipped for the double purpose of training special teachers for the new service and affording models of its methods and purposes. The first of these centers is the Macdonald Institute, an adjunct of the Ontario Agricultural College at Guelph. Sir William Macdonald gave the sum of $182,500 to provide buildings and equipment for the institute, which has become the headquarters for manual training, for household science, and for providing short courses of instruction and training for farmers' daughters and others in cooking, sewing, domestic art, and other branches of domestic economy. Short courses of instruction in nature study and school gardens were provided without fees to teachers, and the governments of 4 eastern provinces where consolidated schools were established gave scholarships to enable teachers to attend. Over 200 teachers have already taken these courses. The second center is Macdonald College, which occupies a beautiful site overlooking the Ottawa River at Ste. Anne de Bellevue, 20 miles west of Montreal. The college comprises 3 departments: the School for Teachers, which provides practical and thorough training for teachers in the art and science of teaching; the School of Agriculture, which aims to provide a thorough theoretical and practical training in the several branches of agriculture; and the School of Household Science, in which young women receive training in household economy. The school for teachers takes the place of the McGill Normal School of Montreal, and is amply equipped for the more extended training which teachers must receive to meet the larger requirements of the service. Macdonald College has been incorporated with McGill University, and thus the courses of instruction leading to degrees are planned under the advice and with the approval of the university authorities. In addition to donating the whole property without incumbrance, Sir William Macdonald placed a sum of over $2,000,000 in the hands of the trustees of McGill University as an endowment for the maintenance of the new college.

Higher Education. — The agencies of higher education in the Canadian provinces are universities and affiliated colleges which have preserved through a long history the scholastic traditions and standards of the universities of the Old World. The colleges as a rule have been established and are maintained by the various religious denominations. The greater number date from the last half of the nineteenth century, but a few have a history covering two or more centuries; among these are: in Ontario, Knox College, Toronto (founded 1504), Albert College, Belleville (1757); in Quebec, Tucker Seminary (1665), St. Sulpice, Montreal (1767). Sixteen institutions bear the title of university, and of these 13 situated in the older provinces bear witness by their numbers to early political and denominational antagonisms. At present there is a strong tendency toward the concentration of the resources of higher education by means of the federation of the colleges and higher technical schools with the universities. In view of a scheme for promoting agricultural education under discussion in the Senate of New Brunswick, in the session of 1908–1909, the Chancellor of the University of New Brunswick urges in his report for the same year that any action that might result should keep the matter in close affiliation with the technical work already carried on by the university.

In Nova Scotia the importance of a common standard for universities has long been recognized, especially in respect to professional diplomas, which the government has declined to recognize because there was no guarantee of equivalence in those of the different institutions. In connection with plans for promoting higher technical education in the province, which were brought to completion in 1908, the representatives of the three universities agreed to an arrangement whereby the Nova Scotia Technical College is affiliated with the other colleges of the province. By this agreement the established colleges will insist on a uniform matriculation requirement, and a uniform first 2 years' engineering course. The general training in mathematics, physics, chemistry, English, foreign language, shopwork, drawing, etc., which constitute the basis for any engineering course, will be given in the older colleges, leaving the professional finishing 2 years' course to the technical college.

Laval University, established at Montreal in 1878, a branch of the ancient university whose seat is at Quebec, is the center of an important group of colleges and schools including the polytechnic, dentistry, and pharmacy schools, the agricultural school of Oka, founded in 1893 by the Reverend Trappist Fathers of Notre Dame du Lac, and the school of superior education for girls founded by the Sisters of La Congregation de Notre Dame, which was solemnly inaugurated in 1907. As an immediate result of the relation with the university, the agricultural school has arranged for a superior course in its specialty. The university affiliation of the school of Notre Dame raises the standard of higher education for women in Catholic circles of Quebec.

The most striking illustrations of the university federation movement are afforded by recent measures affecting the University of Toronto and McGill University of Montreal. The federation of the University of Toronto was proclaimed by the Lieutenant Governor Nov. 18, 1903, and came into effect Nov. 1, 1904. Among the affiliated institutions are the University College, Victoria College, Trinity College, the Toronto School of Practical Science, the Toronto College of Music, and the Agricultural College at Guelph, Ontario, each of which has a representation in the university Senate. The university comprises a faculty of arts, faculty of medicine, faculty of law, and a faculty of applied science and engineering. In addition to the customary degrees in arts, in medicine, and in law, the university offers in applied science the degree of Bachelor of Applied Science, and the degrees of Civil Engineer, of Mining Engineer, of Mechanical Engineer, and of Electrical Engineer, also the degree of Bachelor of the Science of Agriculture. Graduates in the course of pedagogy who hold a degree in arts or a first-class diploma from the Education Department are admitted to the examination for the degree of Bachelor of Pedagogy. Candidates for the degree of Doctor of Pedagogy must have obtained the former degree, or have had 7 years' successful experience as teacher or school inspector in Ontario. The university also offers a 2-year course leading to the diploma in commerce~~, and~~ one of 4 years leading to the degree of Bachelor of Household Science. By the liberality of a private donor, the university has been recently provided with a special building for home economics. The educational work of McGill University is carried on in McGill College, the Royal Victoria College for Women, and other university buildings in Montreal; and also in Macdonald College at Ste. Anne de Bellevue; the McGill University College of British Columbia, Vancouver, B.C., and in the affiliated college at Victoria, B.C. Thus it will be seen that the standardizing influence of this university reaches to the newer provinces. Macdonald College is the latest addition to the federation of which McGill University is the center. By this relation the school for teachers which has taken the place of the McGill Normal School of Montreal, and the two schools pertaining to the latest developments of education in the Province namely, the School of Agriculture and the School of Household Science, are brought under the direction of committees composed of representatives of the university and the college. At the same time the university is broadening its own scope by the inclusion of faculties of agriculture and education.

The creation of faculties of education in the leading universities increases their relations to the public school systems which began with provisions for the inspection and affiliation of high schools, and for the training and certification of teachers aspiring to the highest positions. All the colleges within the borders of Manitoba are affiliated with the university of the province, which has the exclusive right to confer degrees.

Among the universities of the Dominion three distinct types may be recognized. Laval University is ecclesiastic in its origin and control. The Archbishop of Quebec is visitor and apostolic chancellor, the Archbishop of Montreal is the vice-chancellor; the rector, the executive head of the university, is assisted by a council in which the several faculties and the Seminary of Quebec (ecclesiastical institution) are represented. The university comprises the professional faculties of theology, of law, and of medicine, and the faculty of arts, all of which are duplicated in the branch university at Montreal. The latter, as already stated, comprises affiliated technical schools. The general organization and the degrees conferred, *i.e.* bachelor, licentiate, and doctor, follow French precedents. McGill University, a Protestant institution in Montreal, presents the highest type of a private foundation to which imperial character has been given by the amended charter of 1855. This charter constituted "the Governors, Principal and Fellows" of the university a body politic and corporate, but at the same time vested supreme authority in the Crown, the same to be "exercised by His Excellency the Governor General of Canada, for the time being, as visitor." The development of the university has kept pace with the ever growing diversity of public interests, which depend for their forceful direction upon trained intelligence. Toronto University is the highest type of a state institution. It was endowed originally by land grants, and began its active operations in 1843 under the predominant influence of the Church of England. It was brought under state control and completely secularized by the act of 1849. Originally the university was merely an examining and legislative body, the teaching function being reserved for University College. The first event in the developing history of the university was the formation of a teaching faculty, the university professorate, by the federation act of 1887. The crowning event is the act of 1906 reorganizing the university on a comprehensive plan. This measure, already foreshadowed by the federation act of 1903, was required to meet a crisis in university education arising from the advance of science. The Commissioners, upon whose recommendations the plan is based, did not pretend to forecast and regulate the future. "We could do no more," they say, "than provide a home for culture and science, under the same academical roof, uniting them as far as possible, yet leaving each in its way untrammeled by the union." The federation of the Ontario Medical College for Women with the university and the admission of women to the examinations for the university degrees in medicine are significant facts in the recent development. It may be noted that women are admitted to the arts faculties of nearly all the Canadian universities.

UNIVERSITIES OF CANADA

Name	Date of Foundation	Endowment as Reported in 1904	Approximate Number of Students
University of King's College, Windsor, Nova Scotia	1790	$140,000	25
University of New Brunswick, Fredericton, New Brunswick	1800	[1] 8,964	150
McGill University, Montreal, Quebec	1821	2,074,504	1500
Dalhousie College and University, Halifax, Nova Scotia	1818	420,000	360
University of Toronto and University College	1827	3,700,000	2500
University of Acadia College, Wolfville, Nova Scotia	1838	241,970	115
University of Queen's College, Kingston, Ontario	1841	500,000	800
University of Bishop's College, Lennoxville, Quebec	1843	192,918	51
University of Ottawa, Ottawa, Ontario	1848	—	500
University of Trinity College, Toronto[2]	1852	490,000	[3] —
Laval University, Quebec and Montreal[4]	1852	None	1390
University of Mount Allison College, New Brunswick	1862	120,000	125
University of Manitoba, Winnipeg	1877	[5] 150,000	461
Victoria University, Toronto, Ontario[2]	1836	487,455	[3] —
McMaster University, Toronto, Ontario	1887	900,000	200
University of St. Joseph's College, St. Joseph, New Brunswick	1864	—	200
University of Alberta, Strathcona	1906	—	50
University of Saskatchewan, Regina	1907	—	

[1] Government grant.

[2] Federated with University of Toronto.

[3] Included in total of University of Toronto.

[4] Quebec Seminary, an ecclesiastical organization, defrays all expenses.

[5] Acres of land.

The latest estimates give $3,315,900 as the endowment of Toronto University and $7,000,000 as the endowment of the federated university. Recent donations and bequests have brought the endowment of McGill University, with inclusion of Macdonald College, up to $6,000,000. A. T. S.

For educational condition in Newfoundland, see NEWFOUNDLAND, EDUCATION IN.

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CANFIELD, JAMES HULME (1847–1909). — Educator, graduated from Williams College in 1868. For several years he was engaged in railway building and the practice of law, during which period he served for 3 years, without pay, as superintendent of schools at St. Joseph, Mich. From 1877 to 1891 he was professor of history in the University of Kansas; for the next 4 years president of the University of Nebraska, and from 1895 to 1899, president of the Ohio State University. During the last 10 years of his life he was librarian of Columbia University. Author of *College Student and his Problems* (1902). W. S. M.

CANISIUS COLLEGE, BUFFALO, N.Y. — See Jesus, Society of.

CANON LAW ON EDUCATION. — The Canon Law, in the sense in which that term is used in this article, is that body of law which arose in the Middle Ages from ecclesiastical legislation, derived its authority from the Church, and was enforced in the tribunals of the Church. It was composed of the enactments of local and of general councils, extracts from the Fathers of the Church, rules and ordinances of individual bishops, and decretals of the Popes; the last were by far the most important of its constituents, as they were the decisions of the supreme pontiff on points of law arising in cases actually before ecclesiastical courts, and were embodied in directions to those before whom the cases were being heard. In the Canon Law, as it was ultimately codified, all these laws derive their authority from the fact that they were officially promulgated in the thirteenth and fourteenth centuries, as the authoritative body of law to be used in all courts. These official collections make up, together with the *Decretum* of Gratian, which appeared between 1140 and 1150 A.D., what is known as the *Corpus Juris Canonici.* In addition to this law, the *jus commune* of the Church, there was in every part of the Church, especially before 1200 A.D., much law enacted by local synods, holding good in the district in which they were enacted and of force so far as they did not contravene the *jus commune.* This distinction is necessary in stating the bearing of the Canon Law upon education, as there was always much local canon law bearing on the subject, though there was little that belonged to the general legislation of the Church, and none before the twelfth century.

The importance of a study of the Canon Law for the history of education can hardly be overestimated. For every educational institution from the elementary school to the university and every form of instruction from the ABC to astronomy and divinity was regulated by the Canon Law. For nearly 1100 years, from the year 600 to 1700, the Church Courts had exclusive jurisdiction over schools and scholars, the school being regarded as an adjunct of the Church (*q.v.*), and the scholar and those who ministered to him were a branch of the great clerical profession, or body of clerks (*q.v.*). The earliest legislation for education or schools to be found in the Canon Law appears to be in the Sixth Council of Constantinople, held in 680. Canon 5 directs that priests shall keep schools in towns (*villas*) and in villages (*vicos*) and if any of the faithful wishes to commend his little ones to them (the priests) to learn grammar (*litteras*), they shall not refuse to take them, but they shall not demand any fees for them or accept anything from them, except what their parents in their zeal for charity shall voluntarily offer. This was an attempt, probably premature, to utilize the parochial clergy as schoolmasters and establish through them a system of free elementary schools in the rural districts. Canon 4 of the same Council applying to the greater schools in the large towns provided that if any priest wanted to send his nephew (we may guess that the word was originally son) or other relation to school in the churches of saints (*i.e.* the secular cathedrals or collegiate churches) or in the monasteries, "the government of which is committed to us, we give them leave to do so." The Sixth Council of Constantinople was accepted by Pope Adrian as ecumenical, and therefore authoritative. These Canons have been usually attributed to Charlemagne and Theodulph of Orleans, from their appearance among their Capitularies in 771 and 797, but were of course only revived by them. As usual, the law only crystallized and extended practice. For, long before this, at least in France and England, the bishops (see Bishops' Schools) had assumed the control and furnished the supply of schools. The Council of Aix, in 789, under the influence of Alcuin and Charlemagne, ordered that boys' schools should be kept in every monastery and bishop's see, to teach the psalms, singing, arithmetic, and grammar, and Catholic books well corrected should be kept, but the boys should not be allowed to spoil them either in reading or writing, and if gospels, psalters, or missals were wanted, grown-up men should be employed to write them. A later council, assembled at the same place in 813, closed the monastic schools to externs, if they had ever been opened, decreeing, "No schools shall be kept in monasteries except for oblates." So that when the injunction of 780 was repeated at the second Council of Chalons it was confined to bishops' sees. "It is desirable that, as the Lord Emperor ordered, they should establish churches in which the scholastic learning and the proofs of holy scripture should be learnt." In 826, a General Council, under Pope Eugenius II, treated the provision of schools by bishops as a matter of course, and complaining that "of some places we are informed that neither masters are kept nor any care taken for a grammar school (*studio litterarum*)," decreed, "Therefore let all care and diligence be exhibited by all bishops and their subjects and in other places where necessary, that masters and teachers shall be established to teach assiduously grammar schools and the principles of the liberal arts, because in them especially God's commands are made clear and explained." The council under Pope Leo IV in 855, treating of schools "of human as well as divine learning," confirmed this, and reënacted it, because "by long intermission many of God's churches had been invaded by ignorance of the faith and a complete want of learning." A council at Rome held by Gregory VII in 1078 contained a chapter headed "That all bishops shall cause the art of grammar (*artes litterarum*) to be taught in their churches." Almost exactly a century later, in the Lateran Council of 1179 (*Decretales Greg. IX, tom.V, tit. de Magistris*), the requirement was made more stringent and effective by being particularized. It was now provided that, to prevent the opportunity of reading and becoming proficient being denied to the poor, who could not be assisted by their parents' means, a competent benefice should be given in every cathedral church to a master to teach the clerks of the church and poor scholars gratis; while at the same time the taking of fees for granting licenses to teach was forbidden. Alexander III in a rescript (*c.* 1160), said to be addressed (*ibid.*, 2, 3) to the Bishop of Winchester, but which, as it speaks of the Gallic Church, seems more likely intended for the Archbishop of Vienne, reiterates the last order on the ground "Freely (*gratis*) ye have received, freely give," and directs that if anywhere masters have not been appointed because of the demand of fees, proper persons shall be appointed at once. If this was really addressed to a Bishop of Winchester, it may be the result of the appeal in the case of Fantosme *v.* Jekell, referred to the Pope by John of Salisbury (*Hist. Winchester College*, p. 37).

In the next Lateran Council in 1215 Innocent III added to the requirement of a master "in the faculty of grammar," in every cathedral, a similar requirement in every church whose means allowed it, the master to be appointed by the Chapter, and also in every mother church a theological school. Honorius III, in 1219, in highly rhetorical language, repeated the last decree, and, to prevent the scarcity of masters being alleged as an excuse, directed that teachable persons should be sent to a university to be trained up for the purpose, so that they might shine in God's church like stars in heaven; and that students should for five years receive the profits of their canonries and livings as if they were resident. It does not seem to have been necessary to repeat these injunctions again. Grammar and theology were well provided for. But in 1311 we find Clement V at the Council of Vienne insisting on the necessity of having for bishops and missionaries men learned in every language, particularly those used by infidels. So he ordered that at Paris for France, Oxford for England, Scotland, Ireland, and Wales, Bologna for Italy, and Salamanca for Spain, the universities should provide teachers in Hebrew, Arabic, and Chaldee to teach and translate books into those languages, and that funds should be found by contributions from prelates, monasteries, chapters, and collegiate churches. For some years this was actually carried out. At the same council (Clem. iii, t. 10, c. I), at the end of a long statute as to the disorders of monks in dress, conduct, and worldliness, especially in abandoning their conventual life "to wander at large in the courts of princes and magnates," an attempt was made to introduce learning into the monasteries, by providing that in every monastery whose means were sufficient, a fit master should be kept to instruct the monks in the primitive sciences, *i.e.* grammar and rhetoric. Pope Benedict XII took this question up, and in 1335 made elaborate constitutions for the Benedictine monks, which were followed by similar constitutions for the Augustinian or regular canons, providing not only for a grammar master in the monasteries, but for sending a certain proportion of the monks of each monastery to the university. The Canon Law, the *Corpus Juris Canonici*, seems to have been crystallized at this time and ceased to grow, one canon only of Benedict's two successors, Clement VI and Urban V, being incorporated in the *Extravagantes*, or extra series. The schism in the Papacy, no single Pope being recognized by the whole of Christendom, accounts for this. But education was still governed by Canon Law. The Pope's sanction was still required for the establishment of universities or colleges. An attempt was made in England in 1410 in the Gloucester School case to bring grammar schools under the cognizance of the Common Law. But it failed, the judges holding that schools and education were a spiritual matter, for the ecclesiastical courts only.

Even after the Reformation, when the Canon Law was repudiated and its study at the universities forbidden, it still governed educational institutions. The Canons of 1603 contained provisions with regard to schools and schoolmasters. Not till the time of Lord Coke was it held that university colleges, though composed of ecclesiastical persons, were lay corporations amenable to the Common Law. Not till after the Revolution of 1688 did a series of decisions of the courts emancipate the lower branches of education from ecclesiastical control. Grammar schools still remained subject to the jurisdiction of the " Ordinary " until the Endowed Schools Act of 1869 enabled the Commissioners under that Act by scheme to abolish it. A. F. L.

See Benefit of Clergy; Bishops' Schools; Cathedral Schools; Church and Education; Middle Ages, Education in.

CANON LAW, TEACHING OF. — The teaching of Canon Law may be divided into two periods, marked by the appearance of Gratian's *Decretum* between 1141 and 1150. With that work began the systematic and scientific study and teaching of Canon Law. Some study of this subject had always been a practical necessity for the clergy in their administration of the diocesan institutions and in the cure of souls. For the Canon Law was not only public, or constitutional law, but also a sort of criminal law administered in the ordinary penitential discipline of the Church. In the East, however, during the patristic period, the great councils dealt chiefly with theological and constitutional questions. Though many of their enactments became imperial laws, neither they nor the works that appeared on the penitential discipline seem to have given rise to any systematic study or teaching. In the subsequent development of the Eastern churches the relation of the Church and the State prevented an independent treatment of ecclesiastical law. In the West the course of development of Canon Law was different. A multitude of local synods elaborated the penitential discipline and endeavored to adapt the Church to the changed social conditions of the new kingdoms. The Church lived according to Roman Law in the midst of the conflicting Barbarian codes, and this independent position of the Church and its law was developed as it became more and more the international organization of Western Christendom. We therefore find a tendency even at the beginning of the sixth century to make collections of canons of councils and papal decretals, of which by far the most important was that of the monk Dionysius Exiguus, before 526. Other collections soon appeared, among them the *Capitula* of Martin of Braga in 572, and the *Collectio Hispana* ascribed to Isidore of Seville (d. 636) (*q.v.*). The next step may be marked by the revised code of Dionysius presented by Pope Hadrian to Charles the Great in 772, which was adopted for the Frankish Church at the Council of Frankfort in 802. A body of Canon Law came into circulation in this way which might serve as a basis for further developments, and which was itself carefully studied and even glossed. To it should be added the Pseudo-Isidorean decretals, about A.D. 847, which after some use in the ninth century drop from sight as important factors in ecclesiastical law, to come forward in the later development of the ecclesiastical constitution.

There met this stream of Canon Law founded upon conciliar enactments and decretals another stream founded directly upon the penitential discipline, and of private origin. This appears to have arisen in the monastically organized Irish Church, and to have been carried to the Continent by the wandering Irish monks, the *Scoti peregrinantes*, of whom Columban (d. 615) (*q.v.*) was the best representative. This was embodied in penitentials, or handbooks prepared for the use of the clergy in administering penance, and containing lists of sins with appropriate penalties. These books had no official authority, and owed their reception to the reputation of their authors, real or reputed. Among these books the penitential of Theodore of Canterbury, in its various forms, seems to have been the most famous, but there were also widely used penitentials by, or attributed to, Bede, Egbert of York, Halitgar of Cambray, and Rhabanus Maurus. In time almost every diocese had its own penitential, which was studied by the diocesan clergy as a part of their necessary training for their office.

These two lines of development may be said to have joined in the collection of Regino of Prum, *Libri duo de synodalibus causis et disciplinis ecclesiasticis*, A.D. 906, a work of great practical utility, summing up the actual law as it then existed and giving an impetus to new study. During the next 200 years the systematic arrangement of the material was followed, and several important collections appeared, *e.g.* the works of Burchard of Worms, between 1012 and 1023, Anselm of Lucca (d. 1086), Deusdedit, about 1086, and Ivo of Chartres (d. 1117). During this period we have no information as to methods of instruction in Canon Law. The clergy must have used these or similar books, especially the penitentials, and were expected to be familiar with them. But there is no trace of systematic instruction. Canon Law had not yet become a scientific study, and there were no institutions where it could have been taught as such. Students there were of Canon Law, but the whole subject was in the prescientific stage.

In the course of the twelfth century a revolution took place in the teaching of Canon Law, as, indeed, of all other branches of knowledge, and it became one of the principal subjects taught at Bologna and later at all universities. In addition to the general intellectual revival of the twelfth century, which had made itself felt first at Bologna and Paris, there were several causes for the change that came over the study and teaching of Canon Law. There was, in the first place, the revival of a scientific study of Roman Law, whereby under the lead of Irnerius (*q.v.*) and his followers that law became the leading subject studied at Bologna. There had never been a time when Roman Law had not been studied and taught to some extent, and since the latter part of the ninth century its connection with Canon Law was constant. Secondly, there was the new dialectical method used by Abelard (*q.v.*) in his *Sic et Non*, with its fascinating task of balancing and reconciling conflicting authorities, the method first employed in the new teaching of Canon Law. Thirdly, there was the new interest given to the study of Canon Law by the great development of the constitutional and legal sides of the Church in the great struggle which had been inaugurated by Hildebrand and brought to a preliminary triumph in the Concordat of Worms in 1123. The work with which the new method was introduced was the production of a monk of the Convent of St. Felix at Bologna, Gratian by name, who appears to have taught Canon Law and to have published, between 1141 and 1150, his *Concordia Discordantium Canonum*, later known as the *Decretum*. The importance of the work was that it introduced a method of handling the great mass of Canon Law which had grown up, of ridding it by a dialectical method of its innumerable contradictions, and building up from it a consistent body of legal doctrine. Teaching Canon Law was now possible as a scientific pursuit. The reform Gratian introduced was due to his careful distinction as to the force of canons and other legal material, based upon the authority of the councils in which they were respectively enacted and the date at which they were issued, and, what is more important for the advance in method of teaching, to the thoroughgoing employment of the scholastic method of logical distinctions. The effect of the work was instantaneous. Although the *Decretum* never became authoritative in courts of law, and the force of a citation was merely that of the citation in its original form, yet the book was hardly the less influential, for it became at once the recognized textbook, displacing all rivals, and for a time serving as the sole basis of instruction in the same way that the almost exactly contemporaneous *Sentences* of Peter Lombard became the basis of instruction in theology. The relation between these books was therefore well expressed in the fable that these two natives of Lombardy were twin brothers.

The method of teaching Canon Law became at once that which had been inaugurated in the University of Bologna in teaching Civil Law, that of glossing. There was this difference: the text of the *Pandects* was itself authoritative; the *Decretum* was at once a text, not always authoritative, and a gloss upon that text. We have therefore in the work of the glossators, who begin even in Gratian's time, an advance in the interpretation of the law, not always in exact accordance with Gratian's theories. The first of these glossators was Paucapalea, some of whose glosses, marked as *Paleae*, have been incorporated in the text of the *Decretum*. He was followed by a host of other teachers, several of whose *summae* have been published, among them Magister Rolandus, at once a pupil of Abelard and of Gratian, and afterwards Pope Alexander III, the first of the long line of great lawyer popes, Magister Rufinus, Stephen of Tournay, and still others. Bazianus (d. 1197) was the first *Doctor utriusque juris*.

The next development in Canon Law arose out of the study begun by Gratian's work. The leaders of the Church for more than a century were either professors of Canon Law or students of that science, and several, holding pontificates of relatively long periods, produced a mass of legislation which rapidly antiquated the collection of Gratian, though conceived in his spirit. These great legislators were Alexander III (1159–1181), Innocent III (1198–1216), Honorius III (1216–1227), Gregory IX (1227–1241), and Innocent IV (1243–1254), who was one of the greatest canonists of the Church. There were also held three great councils, the Lateran Councils of 1179 and 1215, introducing throughgoing reforms in the administration and law of the Church, and the Council of Lyons, A.D. 1245. This became, therefore, a period of new compilations of which the most important, the *Quinque compilationes antiquae*, have been published (ed. by Friedberg, Leipzig, 1882). They were all arranged after a new system devised by the author of the first compilation, Bernhard of Pavia, who arranged his material, not under the logical divisions of a legal system, but under five general heads, according to the verse, *Judex, judicium, clerus, connubia, crimen,* with the canons and decretals under various titles. In this first compilation were gathered the decretals of the popes since 1139 and the canons of the councils. The first official compilation was one of the five, known as *Tertia,* made at the command of Innocent III by Petrus Collivacinus in 1210, and sent to the University of Bologna, as the great legal university of the Church, that it might be used *tam in judiciis quam in scholis.* Thenceforward the teachers of Canon Law commented upon the decretals in this new collection along with the *Decretum,* and a distinction between Ordinary and Extraordinary lectures was built up similar to that which had become established in Civil Law between the portions of the Pandects known as the *Digestum Vetus,* the *Infortiatum,* and the *Digestum Novum.* Another compilation, the *Quinta,* was sent by Honorius III in 1226 to the canonist Tancred who had been made Archdeacon of Bologna, the official who since 1219 had taken the leading part in the conferring of degrees at Bologna and so acted in place of Chancellor, and also to the University of Paris, which had been rapidly forging to the front. The last step in this development took place in 1234, when Gregory IX sent to these two universities his great collection drawn up by the distinguished canonist, Raymund of Pennaforte, and designed to be of exclusive authority. In this collection we have for the first time a code similar to the *Codex* of Justinian, a complete collection of laws of general authority comprising all the law up to the date of issue that was to retain its force. This code, known as the *Decretales Gregorii IX,* was to serve as the authoritative text not only in courts but in schools. (*Volentes igitur, ut hac tantum compilatione universi utantur in judiciis et in scholis, districtius prohibentes, ne quis praesumat aliam facere absque auctoritate sedis apostolicae speciali,* Bullar. Taur. III, p. 485.) But this was understood as not displacing the *Decretum* of Gratian as the basis of instruction as well, for on the *Decretum* the more important lectures, the Ordinary, were long after still delivered. Two subsequent collections were officially promulgated, the *Liber Sextus,* compiled under Boniface VIII and published in the same way as the Decretals of Gregory IX, and the *Constitutiones Clementis,* or *Clementina,* of Clement V, published in 1317 by John XXII, after the death of Clement at Avignon. To these were added two unofficial collections, the *Extravagantes Johannis XXII* and the *Extravagantes communes,* decretals which, because of their general use in universities as the basis of lectures, were brought together for convenience.

The method of treating these official collections, the genesis of which has been stated, was that of glossing or commenting upon the text. The teacher read a portion of the text, analyzed it, pointed out the significance of the legal principles involved, and showed their application. The task which Gratian had set the teacher of treating the whole mass of law so as to effect the reconciliation of inconsistencies by means of distinctions fell into the background. The aim now was to ascertain the exact meaning and implication of each statement. To this no little assistance was drawn from the Civil Law. The contrast between the two methods can be seen at a glance by comparing such a work as the *Summa* of Hostiensis with the *Summa* of Rufinus, the former based upon the Decretals, the latter upon Gratian. The new method was carried to the highest pitch of refinement by the great Canonists, the first who composed a commentary or *Apparatus* to the five books of the Decretals being no one less than Sinibaldus Fliscus, or Innocent IV, who wrote his *Commentaria in quinque libros decretalium,* one of the best ever written, about the time he held the Council of Lyons, A.D. 1253. The number of the commentators is legion. One of the most important was Henricus de Segusio (d. 1271), later known as Hostiensis, having become Bishop of Ostia. Ægidius Fuscarius (d. 1289) was the first layman to teach Canon Law with distinction, but what is of more importance for the history of the teaching of Canon Law at Bologna was the honor paid to his memory and later to all the other teachers of Canon Law in Bologna, of burial with the same honors as the Doctors of Civil Law, for before his death there had been some disparity between the Canonists and Legists. Prominent as teachers were Wilhelmus Durantis, Guido de Baysio, known as the Archdeacon, because holding that position at Bologna, appointed by the city professor of the *Decretum,* with a special salary, Johannes Andrea, "*fons et tuba juris canonici*" (d. 1314), and many others, all at Bologna. Among the later canonists were Nicolaus de Tudeschi (d. 1443), known as Panormitanus from his diocese, Palermo, and Johannes Turrecremata (d. 1468). But the list of teachers of the first rank is very long, for there was no more profitable employment for legal talent than practice in the ecclesiastical courts, where important cases were constantly being tried, and no more promising ground for rapid advance in preferment than a reputation for canonical learning. For this reason the study of Canon Law was carried on more industriously than even that of theology, for the proficient in theology obtained little advantage in the struggle for ecclesiastical patronage. The parish priest needed little theological training, and obtained even less. The ecclesiastical lawyer held the key to all the high offices.

The University of Bologna set the example to be followed by the other institutions in the method of teaching. In the first place, the instruction was divided into two groups of lectures, the Ordinary, or the more important, and the Extraordinary. The Ordinary covered at Bologna was very probably at first the *Decretum*, but afterwards it came to cover the Decretals of Gregory IX. The Extraordinary covered the *Liber Sextus*, the *Clementina*, and the *Extravagantes*. The division between the two groups became less important than in the Civil Law because of the great difference in extent between the two groups, and Ordinary subjects were necessarily treated in Extraordinary lectures. At Paris the division was also somewhat uncertain. The principal difference between the two classes of lectures, apart from subject matter, was that the Ordinary lectures could be delivered only by the doctors or magisters (the names are synonymous) and in the morning hours, but the Extraordinary lectures might be delivered by advanced scholars as a part of their training for the doctorate, and were in any case delivered in the afternoon. The Ordinary lectures were formal and covered long passages, but the Extraordinary lectures were frequently in the form of discussions of special points, were less formal, and admitted questioning on the part of both instructor and student.

In teaching Canon Law the importance of the gloss was hardly less important than in teaching Civil Law. The *glossa ordinaria* to the *Decretum* was composed by Johannes Teutonicus in 1215, and had the advantage of giving a summary of all the best opinion on the text to that date. This gloss was henceforward copied with the text and used both in the lectures and in the courts. In this way the lecture room was kept in touch with the practical application of the law. The disadvantage was that the comment of the teacher was upon the gloss even more than upon the original text, a failing which characterized the teaching of the Civil Law even more when a *glossa ordinaria* to that had been composed by Accursius in 1260. *Glossae* were also provided for the official collections of decretals, which acquired recognition in the schools and courts as having a sort of authority as *glossae ordinariae*. They in turn were subjected to the same use in lectures as the basis of instruction. These *glossae* do not appear in the modern editions of the Canon Law, of which the best is that of Friedberg, Leipzig, 1879–1881. The last edition with the *glossae* such as was used in instruction throughout the Middle Ages was that published at Lyons in 1671.

Up to the time of the Reformation the center of the study of Canon Law was undoubtedly Italy, and the University of Bologna was the fountainhead. In the sixteenth century the lead was taken by France, and Paris and Toulouse became more prominent than Bologna. A little later Germany began to take a new interest in the subject. At the Reformed and Protestant universities generally, in the centuries following the Reformation, the study of Canon Law undoubtedly fell off. The study of the Civil Law, however, flourished because of the official introduction of the Roman Law on the basis of the fiction that the Holy Roman Empire of the German people was the continuation of the Roman Empire of Constantine and Justinian. With this large parts of the Canon Law had become closely connected, especially in matters treating of marriage and in the civil processes of the courts, the latter a matter in which the Canon Law stood in closer connection with the German practice of the courts than did the Civil Law. Thus in spite of the repudiation of the Canon Law by the Reformers (*cf.* Luther's burning the *Book of the Decretals* along with the Pope's Bull, Dec. 10, 1520), the Canon Law so far as it did not touch the hierarchical system and the doctrines of the Church continued to be taught in the legal faculties of the German universities under non-Roman control. In the Roman Catholic institutions attention continued to be given, the subject was indispensable, but there were no longer the same brilliant prospects open to the canonist.

On account of the importance of Canon Law for the scientific and historical study of many legal topics, it is still studied in the universities of continental Europe, and of other countries where the Roman and the Canon laws have been subsidiary laws. Every term courses are announced in the legal faculties of the larger of these universities on the Canon Law as a whole and upon special topics. It is due to this interest that new textbooks constantly appear in French, German, Italian, and Latin, and the liveliest interest is taken in all topics connected with its history. Thus some of the best textbooks have been written by Protestants, *e.g.* Richter and Friedberg, and the standard edition of the *Corpus Juris Canonici* is by Friedberg, and the eminent historian of French law, Esmein, has written a masterly work on *Mariage en droit canonique*. Canon Law is also studied in all seminaries of the Roman Catholic Church as an essential part of the professional training of the clergy. In English-speaking countries the professional study and teaching of the Canon Law has almost disappeared among Protestants, even where, as in the case of the Anglican Communion, a very large part of the ecclesiastical law of the various branches of that communion is derived from the Canon Law. This is due largely to the attitude taken by Henry VIII toward the Canon Law. He abolished its study at the universities in 1535, encouraging Roman or Civil Law in its place. Though Canon Law remained in force in England after the breach with Rome, it did so only so far as it did not contravene the King's prerogative, a very vague term, or the statutes of the realm. This was further limited by the understanding that only so much was to retain the force of law as could be shown to have been observed in

England prior to the breach with Rome. The fiction was invented that the Canon Law had never been binding in England *proprio vigore*, but had been received by the English people and only in parts. Abortive attempts were made in the sixteenth century to revise the law, but with judges violently opposed to the Canon Law on religious grounds and accepting the preambles to Henry's statutes as historical truth, much of the law was set aside by judicial interpretation. Still there was enough to warrant serious study, if only in the matter of wills and marriage. Yet here a body of law, known as the King's Law ecclesiastical, had grown up, and much study of the decretals would have been regarded as antiquarian research savoring of popery, *e.g.* Ayliffe's *Parergon*. To this condition should be added as a cause for the disappearance of the teaching of Canon Law the disappearance of all legal professorial teaching, for until recently law was read entirely in chambers. There have not yet appeared, so far as can be ascertained, any courses in Canon Law in England, and the study has been confined to the students of history largely. In theological seminaries of the Anglican Communion, the study has been revived to a slight degree, especially in the United States. In American universities some courses have been announced in connection with the study of Medieval and Church History, as at Harvard by Professor E. Emerton. The writer has also lectured at Harvard on Canon Law. There are at present no courses now being given in the subject so far as can be discovered. In the law schools of America, Canon Law fares even worse than the Civil or Roman Law. In these schools, in spite of their great advance in methods of teaching English and American Law, a subject so slightly connected with actual practice of law has obtained no recognition.

The literature bearing on the teaching of Canon Law is scanty and fragmentary. In addition to the textbooks of Canon Law, of which some of the most important are those of Schulte, Friedberg, Richter, Vering, von Scherer, and Walter, all of which contain large sections devoted to the history of the science, the following works may be consulted, but the list is merely suggestive. There is as yet no history of the Teaching of Canon Law. But in addition to the works cited much information may be obtained from the histories of universities in Europe in the Middle Ages, such as those of Rashdall, Denifle, and Kaufmann. The modern method of instruction has taken the form of systems of Canon Law corresponding to the elements of jurisprudence which have been popular in all countries, or to the *Pandectenrecht* of the Germans. Among the more notable textbooks in use at present are those of Friedberg, Richter, Vering, and Devoti. More elaborate treatises have appeared by Hinschius, von Scherer, and Phillips, which, although planned upon the form of a textbook, are very elaborate and profound treatises in several volumes.

J. C. A., Jr.

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CANTOR. — See PRECENTOR; also, CATHEDRAL SCHOOLS; CHURCH SCHOOLS.

CAPE COLONY, EDUCATION IN. — See SOUTH AFRICA, EDUCATION IN.

CAPELLA, MARTIANUS MINEUS FELIX. — Flourished in North Africa probably in the late fourth and early fifth Christian century, though some have placed him a century earlier. He was a lawyer, possibly also a teacher, but little is known of him personally. He lives as the author of a curious allegorical treatise on the Seven Liberal Arts, entitled *De Nuptiis Philologiae et Mercurii* (*Concerning the Marriage of Philology and Mercury*). This work consists of 9 books, the first 2 of which contain the allegory of the marriage, which takes place before the assembly of all the gods of Latin mythology. Apollo presents as gifts to the bride seven maidservants, the seven arts, Grammar, Dialectic, Rhetoric, Geometry, Arithmetic, Astronomy, and Music. As each maid is led forward she relates her parentage and expounds the substance of her arts. These speeches constitute the last 7 books of the treatise. The entire work is extremely pedantic, formal, and involved; the allegorical parts fantastic, the expository ones extremely tasteless and clumsy. But the treatise forms an encyclopedia of the various subjects, displays much learning, and served as text on the entire range of culture as known during the Middle Ages. The book on astronomy clearly foreshadows the heliocentric theory of the universe, but its significance to the Middle Ages was as a convenient summary of the past. With Boethius representing logic, and Donatus and Priscian grammar, Capella completed the authoritative curriculum of the Middle Ages; though objection was often raised to the *Marriage of Philology and Mercury* as being the work of a pagan.

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CAPITAL UNIVERSITY AND THEOLOGICAL SEMINARY, COLUMBUS, OHIO. — The university was established in 1850 to provide academic preparation for the seminary which had been founded in 1830 by the Evangelical Lutheran Joint Synod of Ohio and other states. Classical and scientific courses leading up to the appropriate degrees are offered. A two years' department preparatory to the college is also maintained, to which students who have completed the eighth grade of a common school are admitted. A three years' course is given in the theological seminary, in which both German and English are used in instruction. There is a faculty of 11 professors.

CAPS AND GOWNS. — See Academic Costume.

CARBON DIOXIDE. — See Air of the Schoolroom.

CARDAN. — Girolamo Cardano (Latin, Hieronymus Cardanus; English, Jerome Cardan), was one of the foremost algebraists of the sixteenth century. He was born at Pavia in 1501, and died at Rome in 1576. He was professor of mathematics at Bologna and at Padua. Of his numerous works the most important is the *Ars Magna*, first published at Nürnberg in 1545. (See Algebra.) In this is contained the first printed solution of the cubic equation, a solution that he seems to have obtained from Tartaglia (*q.v.*) under pledge of secrecy, but the proof of which he claims to have supplied. The solution usually goes by the name of "Cardan's method." D. E. S.

CAREW, RICHARD (1555–1620). — An English scholar who was educated at Oxford, a country gentleman, Justice of the Peace, member of Parliament for Saltash, translator of part of Tasso, and writer of an antiquarian book on Cornwall, 1602. Educationally Carew is important as the translator (1594) under the title of *The Examination of Men's Wits* of the Spaniard Juan Huarte's *Examen de Ingenios para las Ciencias* (1557) (see Huarte, Juan), a book advocating the education of youth in accordance with the mental characteristics which they showed before and during the time of instruction, thus really the pioneer of educational psychology. Carew also wrote a short but valuable essay on *The True and Ready Way to Learn the Latine Tongue; expressed in an Answer to a Queri (query), whether the ordinary way of teaching Latine by the Rules of Grammar, be the best Way for Youths to Learn it.* This was reprinted by Samuel Hartlib in 1654, along with the views on the same subject of Eilhardus Lubinus, the German, and Montaigne, the Frenchman. Carew gives an account of his own education. He spent at school 9 or 10 years over the rules of Lily's Grammar. For 3 years he was at Oxford, and 3 further years at the Middle Temple. He then traveled in Poland and Sweden, and had to attempt to use the Latin language as the medium of communication, and found his grammar training fail him. He then went into France, and in three quarters of a year learned more French than he had learned Latin in 13 years. He thence argued that Latin should be taught by "*usual talking* and much reading and writing." He maintains that the rules of grammar arise from the common practice of speech, and not vice versa. Finally, he says: "I hold it likewise very necessary for every teacher to be as diligent in observing the exceeding different nature of all their scholars, according to the dispositions of their person and age, rather than according to their common rules; for some can learn the same thing better at 7 than others at 14; and yet those at the 14 years' end will many times overturn and outgo the same persons, who so much outwent them before." F. W.

CARIES. — See Teeth, Hygiene of.

CARLETON COLLEGE, FARMINGTON, MO. — A coeducational institution founded in 1854 as an academy. It is now under the auspices of the Methodist Episcopal Church. Preparatory, academic, collegiate, and musical departments are maintained, though the work given is chiefly preparatory. Degrees are conferred.

CARLETON COLLEGE, NORTHFIELD, MINN. — A coeducational institution founded as Northfield College, which received its first class in 1870. The first trustees, nominated in 1866 by the State Association of Congregational Churches, adopted articles of incorporation and became a self-perpetuating body of 24 members, free from denominational control; each trustee serves 4 years. A preparatory school was opened in 1867 and discontinued in 1906. Upon the location of the college in Northfield, its citizens gave $20,000, and the Congregational churches of the state $10,000, toward the establishment of a "Founder's Fund." The college is one of 23 institutions fostered by the Congregational Educational Society. In recognition of the first large donation, $50,000 from Mr. William Carleton of Charlestown, Mass., the name was changed to Carleton College, Jan. 16, 1872. Other gifts formed the nucleus of the General Endowment Fund, including $50,000 from Dr. D. K. Pearsons of Chicago. The largest single gift has been $100,000 from Mr. William H. Laird of Winona, in 1905. The college is endeavoring to complete an endowment of $500,000. Carleton College is one of the institutions originally accepted by the Carnegie Foundation for the Advancement of Teaching (*q.v.*). Besides the usual undergraduate courses, admission to which is by examination or certificate, the college maintains a school of music and graduate courses; the degree of M.A. is given for 1 year's study in residence, or 2 years' study *in absentia*, in each case requiring a thesis. The department of mathematics and astronomy offers courses leading to the Ph.D. By arrangement with the University of Minnesota, students intending to study medicine may, during their senior year, take professional studies in the university. Women must reside in Gridley Hall, the women's dormitory, or in other buildings exclusively for their use; the supervision of the women is committed to a dean, and regulations governing social relations between men and women are strict. There are no fraternities: Phi Kappa Psi maintained a chapter from 1883 to 1888. The college owns the Laird Athletic Field, situated on the bank of the Cannon River. There are no dormitories for men. The library has 23,000 volumes. Grounds, buildings, and equipment were valued (1906) at $232,000; the total annual income was $33,600. The average salary of a professor is $1400. The instructing staff (1909) numbers 21, of whom 8 are full professors. There are 340 students, divided as follows: College, 310; School of Music, 30. Donald J. Cowling is president. C. G.

CARLYLE, THOMAS, AS AN EDUCATOR. — The chief events in the life of Carlyle, emphasizing especially those related to his career as a teacher, a teacher in the technical sense of the word, are as follows: Thomas Carlyle (born Dec. 4, 1795, at Ecclefechan in southern Scotland) learned the alphabet, he says, at his mother's knee. At the age of 5 he was in the village school. At about 7 he was reported "complete in English, . . . I must go on to Latin or waste my time." To Latin then he went, and soon "made rapid and sure way." At ten he entered Annan Academy, May 26, 1806. After three years of gerund-grinding he could read Latin and French "with fluency," and he knew something of geometry, algebra, and geography. On Nov. 9, 1809, while he was yet 13, he entered Edinburgh, having walked from Ecclefechan in three days. The earliest reference to Carlyle as engaged in teaching is apparently the following, from the earliest letter from his father that has been preserved:

ECCLEFECHAN, 27th April, 1814.

Dear Sir, — I received yours yesterday, and was very glad to hear that you were well and was teaching, for we did not know what to do, whether you were coming home or going to stop at Edinburgh; . . .

In the summer of 1814 — in June — Carlyle was appointed mathematical master in his old school at Annan, "salary about £70." Here he remained about two and one half years, "a clear and correct expositor," but doing violence to educational doctrine in that he did not mingle freely in the social life of the place. In late autumn of 1816 he became parish schoolmaster at Kirkcaldy, a few miles beyond Edinburgh, where he and Edward Irving (later a distinguished London preacher and founder of a sect) became fast friends. On Nov. 20, 1818, Carlyle left for Edinburgh with no definite prospects, and with perhaps £100 of his savings. On Dec. 17 he wrote to his mother, reassuringly, that he had three hours of private teaching at two guineas a month for each hour. But by the middle of January these particular engagements had come to an end. In Feb., 1819, he spoke of "a slight tincture" of the German language, which he is receiving in return for an equally slight tincture of the French, which he is communicating. On Mar. 29 he is "still at the German," and is able to read books now, with a dictionary. As late as 1834, when Carlyle was 38 years of age and had written *Sartor Resartus* and his *Essay on Burns*, and had been for years in intimate correspondence with Goethe, he was exchanging lessons in geometry for lessons in Greek. "Began Homer two weeks ago. . . . Poor Glen is my very sufficient help here" — though this exchange was doubtless largely for his friend's sake, a man of genius, whose mind was sinking into eclipse.

The three years following the resignation of his Kirkcaldy school, that is, 1819, 1820, 1821, were years of sore trial to himself, for many reasons, and of disappointment to his family. Tom would neither go on into the ministry nor remain in the respectable rank of the professional schoolmaster. He spent the winters at Edinburgh, the summers at home. He was earning something writing articles for Brewster's *Encyclopœdia*, and there are occasional references in the correspondence with friends and family to private teaching. In Sept., 1820, he refused a (Yorkshire) traveling tutorship, and again in 1821 a tutorship offered by his Kirkcaldy friend, Provost Swan. But in Jan., 1822, he accepted an offer that came to him through his friend Irving, now in London, of a tutorship to two promising youths — one of whom, Charles Buller, in after years had a share in giving responsible government to England's greatest colony, "Our Lady of the Snows"; the other, Arthur Buller, later "Sir Arthur and Indian Judge" (on the opposite side of the world from Canada), both to the last "always generously grateful" to their remarkable tutor. The £200 per annum "and good accommodations in the house" was to him opulence. He sent for his brother John — later translator of the *Inferno* — to come to the university at his expense, and in various ways came to the support of the family. This tutorship he held until July, 1824. By this time he had translated Legendre's *Geometry* from the French, Goethe's *Wilhelm Meister's Apprenticeship* from the German, and had written a Life of Schiller for the *London Magazine.* And he had wooed and won the beautiful and brilliant Jane Baillie Welsh.

After their marriage on Oct. 17, 1826, there were at various times attempts made to secure for Carlyle a university professorship. In the latter part of 1827 one of the new London professorships was talked of — English literature or moral philosophy. In the early part of 1828 a concerted attempt was made to secure for Carlyle the vacant professorship of moral philosophy in St. Andrews University. "Equal testimonials," says Froude, "viewed by the intrinsic quality of the givers, to those which were collected or spontaneously offered on this occasion, were perhaps never presented by any candidate for a Scotch professorship." Goethe wrote a magnanimous testimonial. Carlyle wrote to his brother John at Munich that such praise as this one "ought to value more than any Professorship in these parts." This testimonial from Goethe was, as a matter of fact, probably not presented to the St. Andrew electors — not that it would have affected the decision. "Dr. Cook is as good as appointed; . . . Goethe's certificate arrived while I was in the country: mustard after dinner; which these rough feeders shall not so much as smell!" — Letter to Dr. John Carlyle, Munich, Apr. 16, 1828. As to a possible appointment to a professorship in Glasgow University, Carlyle writes to his brother Aleck in January, 1833: "We shall see. My own private impression is that I shall never get any promotion in this world."

In the early part of 1834 a professorship in astronomy was about to be established in Edinburgh. Carlyle had always excelled in mathematics, and was qualified for the post. But this time Jeffrey could not help — his influence having already, perhaps, been given to another. He, however, embraced the occasion to read Carlyle a lecture. There was another professorship, viz. rhetoric, to which he might have conscientiously recommended Carlyle, had not Carlyle made the mention of his name in such a connection ridiculous. (*Sartor Resartus* was now appearing in *Fraser's Magazine,* and was being received with universal execration.) This was the last time Carlyle looked for such appointment. Before the middle of June, 1834, he was established at No. 5 Cheyne Row, Chelsea, London — his home for the rest of his life. In 1841 he received an invitation from a body of Edinburgh students to stand for a professorship. Carlyle was touched, but could not now accept. In 1844 he declined a professorship at St. Andrews. But in 1865, after the publication of the last volume of *Frederick the Great,* he received by so large a majority the nomination to the Lord-Rectorship of the University of Edinburgh, his own university, that he could not decline. It was the highest tribute his countrymen could pay him — it was Scotland's recognition of her gifted son.

The "perfect triumph" of the Inaugural Address, Apr. 2, 1866, and the subsequent universal acclaim were followed, while Carlyle was still detained among his kinsmen, by the shock of the sudden death of his wife, and the light of his life was gone out. On Feb. 5, 1881, Carlyle died, and according to his wish was buried with his people in Ecclefechan kirkyard.

Carlyle was thus a teacher, in the technical sense of the word, for years. Furthermore, he wrote much on strictly educational themes. And inasmuch as the readers of this peasant-born writer of magnificent, rhythmical, vivid, vital, imperishable English prose have been numbered by the million and are found in every corner of the English-speaking world and in other lands as well, his influence on educational thought and practice, but especially on educational ideals, cannot easily be overestimated.

Carlyle's recognition by his own generation was long delayed, but it came at last in a flood. That immortal work of genius, *Sartor Resartus* (which appeared in book form first in America, thanks to Emerson), could not for a time find a publisher in England, except the author pay the publisher £150 to guarantee him against loss; but before the author's death a popular edition of 30,000 copies was printed and sold. *Sartor Resartus* from beginning to end is full of ideas of educational significance. And inasmuch as the education of the hero, Teufelsdröckh, is described in detail, large parts of this wonderful book are in fact as strictly educational in interest as Rousseau's *Émile.* Stimulating and suggestive comment on educational matters is found in all of Carlyle's work, for Carlyle himself was greatly interested in education.

This interest in educational problems and theories doubtless arose partly out of his experience in the classroom, but it was assuredly greatly stimulated by the study which Carlyle made — as no English-speaking man before him had made — of German literature and German philosophy. He read Goethe's *Faust* in 1820, and in 1822 published an account of it in the *New Edinburgh Review.* In 1823 and 1824 he was at work on Goethe's greatest novel, *Wilhelm Meister. Wilhelm Meister's Apprenticeship,* translated by Thomas Carlyle, was published in 1824. This one book — so wise, so rich a storehouse as it is of philosophic discussion, of illuminating comment on life and art — must in itself have suggested to so gifted a reader as Carlyle a wide range of ideas concerning education and concerning life. But by the time he began on *Sartor Resartus* he had ranged over the whole field of German thought, and in silence had meditated and grown wise in the stillness of his moorland Craigenputtock home. As it was manifestly unprofitable for Carlyle to attempt "to state the Philosophy of Clothes without the Philosopher, the ideas of Teufelsdröckh without something of his personality," there are in *Sartor Resartus*, as a matter of course, chapters on Genesis, Idyllic (childhood days), Pedagogy, Getting under Way, Romance, etc., with comment on heredity, environment, the creative instinct in children (and their apparently wanton breakages as due to this instinct), the gregarious sports by which the youth trains himself to coöperation, good passivity, and good activity, the village schoolmaster, who pronounces Teufelsdröckh a genius and sends him on to the gymnasium — where, also, his teachers are "hide-bound pedants without knowledge of man's nature or of boy's," "inanimate, mechanical gerund-grinders," who cram into their pupils "Innumerable dead Vocables," and call it "fostering the growth of mind." They "knew syntax enough; and of the human soul thus much: that it had a faculty called Memory, and could be acted-on through the muscular integument by appliance of birch-rods." "Alas, so is it everywhere, so will it ever be; till the Hodman is discharged or reduced to hod bearing; and an Architect is hired, and on all hands fitly encouraged: till communities and individuals discover, not without surprise, that fashioning the souls of a generation by Knowledge can rank on a level with blowing their bodies to pieces by Gunpowder; that with Generals and field marshals for killing, there should be world-honoured Dignitaries, and, were it possible, true God-ordained Priests, for teaching." Through contact with such true God-ordained priests is the mind of youth fostered, which grows "like a Spirit by mysterious contact of Spirit; Thought kindling itself at the fire of living Thought."

Before *Sartor Resartus* was published, Carlyle, in *Corn-Law Rhymes* (1832), had asked, "But what, after all, is meant by *uneducated*," in these unhappy times, "when he that is the least educated will chiefly have to say that he is the least perverted" — a question and answer "significant of much." "As if it were by universities and libraries and lecture-rooms, that man's Education, what we call Education, were accomplished." The first sentence of *Latter-Day Pamphlets* (1850) is, "The Present Time . . . to know *it*, and what it bids us do, is ever the sum of Knowledge for all of us." "I foresee," he says, "that our Etons and Oxfords with their nonsense-verses, college-logics, and broken crumbs of mere *speech*, . . . will be found a most astonishing seminary for the training of young English souls to take command in human Industries, and act a valiant part under the sun!"

Carlyle's chief service to the cause of education perhaps is the persistence with which he insisted upon England's duty to provide education for *all*. In 1831 no English publisher could be found for this noble passage: "Two men I honour and no third. First, the toil-worn Craftsman that with earth-made Implement laboriously conquers the Earth, and makes her man's. . . . Hardly-entreated Brother! For us was thy back so bent, for us were thy straight limbs and fingers so deformed: thou wert our Conscript, on whom the lot fell, and fighting our battles wert so marred. For in thee too lay a god-created Form, but it was not to be unfolded; . . . It is not because of his toils that I lament for the poor: . . . But what I do mourn over is, that the lamp of his soul should go out; that no ray of heavenly, or even of earthly knowledge, should visit him; . . . That there should one Man die ignorant who had capacity for Knowledge, this I call a tragedy, were it to happen more than twenty times in the minute, as by some computations it does. The miserable fraction of Science which our united Mankind . . . has acquired, why is not this, with all diligence, imparted to all?"

Why is not this, with all diligence, *imparted to all?* To this challenge Carlyle returns again and again. Who would suppose, he cries in *Chartism* (December, 1839), that education were a thing which had to be *advocated?* This, one would imagine, was the first function that a government would set about discharging.

"Were it not a cruel thing to see, in any province of an empire, the inhabitants living all mutilated in their limbs, each strong man with his right arm lamed? How much crueler to find the strong soul, with its eyes still sealed, its eyes extinct so that it sees not! Light has come into the world, but to this poor peasant it has come in vain. . . . Heavier wrong is not done under the sun. It lasts from year to year, from century to century; the blinded sire slaves himself out, and leaves a blinded son; and men, made in the image of God, continue as two-legged beasts of labour; and in the largest empire of the world, it is a debate whether a small fraction of the Revenue of one Day . . . shall, after Thirteen Centuries, be laid out on it, or not laid out on it. . . . Dissenters call for one scheme of Education, the Church objects; this party objects, and that. . . . Pity that difficulties exist; that Religion, of all things, should occasion difficulties."

To Carlyle as to Sterling it is "monstrous" that the State is prevented from "teaching Roman Catholic children to read, write and cipher, merely because they believe in the Pope." "How dare any man, especially a man calling himself minister of God, stand up in any Parliament or place, under any pretext or delusion, and for a day or an hour forbid God's light to come into the world, and bid the Devil's Darkness continue in it one hour more!"

In successive volumes, Carlyle continued to call for a right Educational Bill, for an efficient teaching service, for a captain general of teachers, a minister of education, whose work would be to provide a feasible plan whereby the alphabet should get itself taught and God's light should come into the world. He lived to see the work entered upon, in the Education Act of 1870. No small part in the awakening of the conscience of England to this duty was taken by Thomas Carlyle. R. J.

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CARMINA BURANA, CARMINA VAGORUM. — Student songs, whose origin may be referred back to the end of the twelfth and beginning of the thirteenth centuries. The first title is given to a collection of such songs contained in a Ms. of the thirteenth century found in the monastery of Benedictbeuern in Bavaria and now preserved at Munich. The second title contains the reference to the wandering life of the students of that period. (See BACCHANTS.) As the productions of a class which stood outside the general life of the times, they present pictures of the student attitude to the Church and people. The songs may be separated into two main divisions according to content. One type deals with the wandering life, with the delights of spring and nature, with the pleasures of love and wine, and with gambling and the students' struggle for existence. The other type includes satires on society and the Church, and moral and religious disquisitions. A sense of brotherhood among the students marks the songs, which were so widespread that it is difficult to locate their origin. . The student brotherhood soon developed into a so-called guild with Golias as the patron saint. Who Golias was, into whose mouth most of the songs are placed, is not known. Probably he was a mythical personage created by the students to serve their purpose. Hence the songs are the songs of a class and not individual, so that it is hopeless to attempt to trace the author in each case. The songs are written in a great variety of meters, but are all marked by a lilt and swing which was demanded by the purpose which called them forth. Though written in Latin, the classical meters are rarely found. Instead, accent and rhythm are given first place. In many cases the measures are borrowed from church hymns, which are frequently parodied. In their boldness and freshness, and freedom from conventional restrictions, in the pagan view of life and the opposition to the Church, Symonds traces the beginnings of the early Renaissance and a revolt against the limitations and restraints of the time.

In addition to the Ms. of the Carmina Burana, which Symonds has translated in *Wine, Women and Song,* another series of student songs is collected in a Harleian Ms. written before 1264. This series, whose authorship is attributed to Walter Mapes, was edited in 1841 by Thomas Wright.

References:—

SYMONDS, J. A. *Wine, Women and Song.* (Portland, Me., 1899.) This book contains a good bibliography on the subject of student songs.
WRIGHT, T. *Walter Mapes.* Camden Soc. Publ., Vol. 50. (London, 1850.)

CARNEGIE EDUCATIONAL PHILANTHROPIES. — Among the many remarkable gifts for education and for the various forms of social betterment which have marked the present generation, none have been more noteworthy because of the principle involved or the vast sums contributed than those of Andrew Carnegie.

Andrew Carnegie was born in Dunfermline, Scotland, in 1837, and was brought to this country when twelve years of age. After a boyhood passed in a variety of occupations, as with many American boys, the close of the war found him as government superintendent of military railways and telegraph lines in the East. The foundations of his great wealth were laid in his introduction of the Bessemer steel process into the United States. Mr. Carnegie's entire life is identified with the upbuilding of the steel industry in this country, until he retired in 1901, with a colossal fortune, with the formation of the United States Steel Corporation.

Mr. Carnegie's name will ever be associated with one particular form of philanthropy and one particular instrument of educational work, — the free library. His father before him was interested, with five fellow weavers, in the establishment of a library in his native Scotch town. In 1865 Mr. Carnegie became a life member of the Mercantile Library and Mechanics Institute of Pittsburg. In 1886 the firm of Carnegie Brothers and Company presented to each of their office employees an annual membership in the same library, and an alcove was added for the purchase of appropriate books, and was named by the authorities "the Carnegie Alcove." Some years after this the gifts for the notable Carnegie libraries of Pittsburg were begun. And from there grew the general scheme for library encouragement all over this country, and in fact over the English-speaking world.

The principle underlying practically all of these gifts is that the community must agree to devote to the annual support of the library a sum approximately one tenth of the sum given for the building; for Mr. Carnegie's benefactions are usually given for the building itself. The motives leading to this form of benefaction are summarized thus by the founder: "(1) The library gives nothing for nothing. The youth who is improved by it must coöperate. If he does not read and study, he finds no reward. (2) The library supported by taxation is owned by the community. It is no gift to the poorer classes. They must also contribute their mite. It is the library of the people, and within its walls the poorest citizen has all the rights of the Mayor. (3) Free public libraries are the cradles of triumphant democracy. (4) The donor does not pauperize the community; he gives the building, the community furnishes the site and maintains the library."

To Jan. 1, 1910, Mr. Carnegie had given $54,000,000 to more than 2000 libraries. The circulation per year for these libraries is estimated to be over 180,000,000 volumes or more than there are English-speaking people in the world. The gifts are distributed as follows: —

THE TOTAL OF MR. CARNEGIE'S LIBRARY GIFTS

United States . .	1029 buildings	208 branches	$36,160,035
Canada	96 buildings	5 branches	2,240,715
England and Wales	344 buildings	59 branches	8,935,380
Ireland	45 buildings	21 branches	767,347
Scotland	115 buildings	18 branches	2,142,143
New Zealand . .	17 buildings		167,062
British West Indies	5 buildings		119,000
Australia and Tasmania	4 buildings		69,280
South Africa . .	4 buildings		31,244
Seychelles Islands .	1 building		10,000
Fiji Islands . . .	1 building		7,500
College Libraries .			3,660,753
		Total	$54,310,459

The distribution of these gifts in this country is as follows: —

Alabama	15 libraries,	$306,300.
Arizona	3 libraries,	54,000.
Arkansas	3 libraries,	125,600.
California	76 libraries,	1,832,787.
Colorado	21 libraries,	528,443.
Connecticut	7 libraries,	65,840.
Delaware	1 library,	6,000.
Florida	4 libraries,	100,000.
Georgia	18 libraries,	398,200.
Hawaii	1 library,	100,000.
Idaho	7 libraries,	95,500.
Illinois	87 libraries,	3,279,430.
Indiana	69 libraries,	4,687,680.
Iowa	80 libraries,	1,303,906.
Kansas	41 libraries,	600,840.
Kentucky	15 libraries,	776,300.
Louisiana	5 libraries,	340,000.
Maine	19 libraries,	210,550.
Maryland	5 libraries,	555,500.
Massachusetts	29 libraries,	747,500.
Michigan	42 libraries,	1,486,700.
Minnesota	43 libraries,	573,400.
Mississippi	3 libraries,	35,000.
Missouri	20 libraries,	1,389,000.
Montana	11 libraries,	154,200.
Nebraska	24 libraries,	350,000.
Nevada	2 libraries,	35,000.
New Hampshire	12 libraries,	159,000.
New Jersey	21 libraries,	651,405.50
New Mexico	2 libraries,	20,000.
New York	48 libraries,	6,545,873.
North Carolina	9 libraries,	147,945.71
North Dakota	8 libraries,	117,700.
Ohio	71 libraries,	2,509,783.64
Oklahoma	10 libraries,	163,000.
Oregon	7 libraries,	180,000.
Pennsylvania	39 libraries,	3,179,215.65
South Carolina	6 libraries,	71,200.
South Dakota	6 libraries,	171,000.
Tennessee	9 libraries,	252,500.
Texas	29 libraries,	604,200.
Utah	4 libraries,	58,500.
Vermont	3 libraries,	73,000.
Virginia	4 libraries,	211,000.
Washington	21 libraries,	741,500.
West Virginia	4 libraries,	91,500.
Wisconsin	47 libraries,	849,861.
Wyoming	11 libraries,	186,500.
District of Columbia . . .	2 libraries,	725,000.
Indian Territory	3 libraries,	30,000.
Porto Rico	1 library,	100,000.

Besides the library benefactions, Mr. Carnegie's generosity has been directed toward the improvement of educational facilities in other ways. Most notable among these are The Carnegie Foundation for the Improvement of Teaching, founded in 1905 by the gift of $10,000,000, to which $5,000,000 were added in 1908; and the Carnegie Institution of Washington for the encouragement of research, by the gift of $10,000,000 in 1902. These are discussed under the appropriate captions.

In addition to these Mr. Carnegie has given generously to various colleges and universities at various times. Chief among these is the Carnegie Technical Institution of Pittsburg, which has received over $4,000,000. One other form of Mr. Carnegie's benefactions which looks toward the education of the people is the frequent gift of church pipe organs — more than 4000 in all — for the purpose of improving the musical tastes of the people.

References: —

Library Journal: an early number, usually January, each year gives a summary of Mr. Carnegie's gifts for the preceding year.

CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING. — An organization established Apr. 16, 1905, by Mr. Andrew Carnegie, having for its primary purpose the establishing of retiring allowances in the colleges, universities, and technical schools of the United States, the Dominion of Canada, and Newfoundland. On this date Mr. Carnegie expressed his wish in a letter addressed to 25 men whom he had selected as trustees of the fund. A part of this letter follows: —

New York, April 16, 1905.

Gentlemen: —

I have reached the conclusion that the least rewarded of all the professions is that of the teacher in our higher educational institutions. New York City generously, and very wisely, provides retiring pensions for teachers in her public schools and also for her policemen. Very few, indeed, of our colleges are able to do so. The consequences are grievous. Able men hesitate to adopt teaching as a career, and many old professors, whose places should be occupied by younger men, cannot be retired.

I have therefore transferred to you and your successors, as Trustees, $10,000,000, 5 per cent First Mortgage Bonds of the United States Steel Corporation, the revenue from which is to provide retiring pensions for the teachers of Universities, Colleges, and Technical Schools in our country, Canada, and Newfoundland under such conditions as you may adopt from time to time. Expert calculation shows that the revenue will be ample for the purpose.

The fund applies to the three classes of institutions named, without regard to race, sex, creed, or color. We have, however, to recognize that State and Colonial Governments, which have established or mainly supported Universities, Colleges, or Schools, may prefer that their relations shall remain exclusively with the State. I cannot, therefore, presume to include them.

There is another class which States do not aid, their constitution in some cases even forbidding it, viz., Sectarian Institutions. Many of these, established long ago, were truly sectarian, but to-day are free to all men of all creeds or of none — such are not to be considered sectarian now. Only such as are under the control of a sect or require Trustees (or a majority thereof), Officers, Faculty, or Students, to belong to any specified sect, or which impose any theological test, are to be excluded.

Gratefully yours,
Andrew Carnegie.

The trustees were erected into a corporation by an act of Congress approved Mar. 10, 1906, and the first retiring allowances granted went into effect on July 1 of that year. Colleges, universities, and technical schools maintained by state and colonial governments had not been included by the original letter of gift. The state and colonial institutions having formally requested that the benefits of the Foundation be extended to them, Mr. Carnegie, on Mar. 31, 1908, expressed his willingness to provide for their inclusion in the retiring allowance system, by offering an additional $5,000,000 to the fund, making the total gift $15,000,000. On May 7, 1908, the trustees of the Foundation accepted this additional trust. To render the Foundation a more integral part of higher education in America, the trustees desire, as far as may be, to have their relations with the institutions of higher education rather than with the individual professors. For this purpose the Foundation receives applications from institutions to be placed upon the list of colleges, universities, and technical schools designated as the accepted list. To be placed upon this list the educational standard, the plan of government, and the endowment of the institution must conform to certain definite regulations. In the administration of the fund, therefore, the task of the board has been not to pass upon the merits of individuals, but of colleges. Each such application involves a study of the method of government, the educational value of each institution as a center of intellectual and moral influence, the financial resources, the equipment, and the standards of academic work. Once an institution is placed upon the accepted list, the teachers and executive officers may retire under fixed regulations for the granting of retiring allowances. The allowance comes as a right, not as a charity; as a thing earned in the regular course of service, not as a courtesy. Sixty-seven institutions are on the accepted list, and about 320 life allowances have been granted. At the beginning of the year 1910 about $850,000 had been paid in retiring allowances.

A summary of the data concerning retiring allowances in force at the end of the fiscal year, Oct. 1, 1909, is given in the following table: —

Beneficiaries	Number of Retiring Allowances in Force				Average Age at Date of Retirement			Average Length of Service			Amount of Average Allowance			Total Grant in Force Sept. 30, 1909
	On basis of age	*On basis of service*	*On basis of disability*	*Total number of allowances in force*	*Of those retiring on basis of age*	*Of those retiring on basis of service*	*Of those retiring on basis of disability*	*Of those retiring on basis of age*	*Of those retiring on basis of service*	*Of those retiring on basis of disability*	*Of those retiring on basis of age*	*Of those retiring on basis of service*	*Of those retiring on basis of disability*	
Professors in Accepted Institutions	88	70	15	173	69.7	64.7	49.1	30.5	35.2	15.5	$1534.32	$1775.64	$1726.33	$285,210
Professors not in Accepted Institutions	45	47	8	100	69.8	69.0	49.3	30.2	38.3	22.4	$1179.22	$1695.74	$1325.00	$143,365
Widows of Professors in Accepted Institutions . .				32							$899.22			$28,775
Widows of Professors not in Accepted Institutions . .				13							$690.00			$8,970
Total, Sept. 30, 1909	133	117	25	318							General Average of Retiring Allowances . . $1466.42			$466,320

As a matter of fact, the chief work of the Foundation is that of an educational agency, dealing with institutions of higher learning in America. The viewpoint is national; it includes the interests not alone of a community or of a section, but of a continent. From time to time the Foundation publishes in pamphlet form studies in education. The annual report of the president also deals with various educational problems in addition to those which concern only the administration of the trust. These publications are distributed among college teachers and officers and those interested in education. The fund does not provide allowances for teachers in secondary school work or in the grades. The following rules give the bases on which allowances are computed: —

Rule 1. Any person sixty-five years of age who has had not less than fifteen years of service as a professor, or not less than twenty-five years of service as instructor or as instructor and professor, and who is at the time a professor or an instructor in an accepted institution, shall be entitled to an annual retiring allowance computed as follows: —

(*a*) For an active pay of twelve hundred dollars or less, an allowance of one thousand dollars, provided no retiring allowance shall exceed ninety per cent of the active pay;

(*b*) For an active pay greater than twelve hundred dollars the retiring allowance shall equal one thousand dollars, increased by fifty dollars for each one hundred dollars in excess of twelve hundred dollars;

(*c*) No retiring allowance shall exceed four thousand dollars.

Rule 2. Any person who has had twenty-five years of service as a professor or thirty years of service as professor and instructor in an accepted institution, shall, in the case of disability unfitting him for the work of a teacher as proved by medical examination, be entitled to a retiring allowance computed as follows: —

(*a*) For an active pay of twelve hundred dollars or less, a retiring allowance of eight hundred dollars, provided that no retiring allowance shall exceed eighty per cent of the active pay;

(*b*) For an active pay greater than twelve hundred dollars, the retiring allowance shall equal eight hundred dollars, increased by forty dollars for each one hundred dollars in excess of twelve hundred dollars;

(*c*) For each additional year of service above twenty-five for a professor, or above thirty for an instructor, the retiring allowance shall be increased by one per cent of the active pay;

(*d*) No retiring allowance shall exceed four thousand dollars.

Rule 3. A widow who has been for ten years the wife of a teacher, who at the time of his death was in receipt of a retiring allowance, or who at the time of his death was eligible to a retiring allowance, or who had had twenty-five years of service as a professor, or thirty years of service as an instructor and professor, shall receive as a pension one-half of the retiring allowance to which her husband was entitled under Rule 1 or would have been entitled under Rule 2 in case of disability.

The administrative officers are Henry S. Pritchett, president; Robert A. Franks, treasurer; John G. Bowman, secretary. The offices are at 576 Fifth Avenue, New York City.

J. G. B.

Reference: —

Annual Reports of the President and Treasurer of the Carnegie Foundation for the Advancement of Teaching. (New York, 1906 to date.)

CARNEGIE INSTITUTION. — An institution founded and endowed by Mr. Andrew Carnegie, of New York City, and organized as a quasi-national institution by a special act of Congress. The purpose of the institution is to aid and encourage investigation, research, and discovery, and the application of knowledge to the improvement of mankind. On Jan. 28, 1902, Mr. Carnegie executed a deed of trust, transferring $10,000,000 of 5 per cent bonds to 26 trustees, named by him in the trust, to found the Carnegie Institution of Washington, D.C., for the purpose of improving and extending the opportunities for study and research in this country. The aims of the institution, as set forth by Mr. Carnegie, were to promote original research; to discover the exceptional man in every department of study; to increase the facilities for higher education; to increase the efficiency of the universities of the country; to enable students to enjoy the advantages of the governmental institutions in Washington; and to publish the results of important scientific investigations. The founding of the institution came as a culmination of efforts which had been made to secure the endowment of a George Washington Memorial University in Washington, which should be a national university. It was thought at the time that the creation of this Institution would meet all such national needs, and these ideas are in part expressed in Mr. Carnegie's deed of trust. The Institution was originally organized as a corporation in the District of Columbia, but, in 1904, it was reïncorporated as a quasi-national institution by Congress. In 1907, Mr. Carnegie added $2,000,000 in 5 per cent bonds to the endowment.

The *Year Books* tell the history of the Institution and its work. At first there was much uncertainty as to what the work of the Institution should be. Committees were appointed in the different fields of knowledge, and reports as to needs were made. The proposals for investigation far exceeded the income of the Institution, and, pending further inquiry, a number of small grants were made to individual investigators. Gradually "larger projects" were decided upon and inaugurated, though the smaller individual grants have been continued, in slowly decreasing numbers. The experience of the Institution seems to be, however, that the best returns are to be obtained by expending the income on a few larger projects, rather than in scattering it in aid of many smaller ones, and to connect with these larger projects a number of capable investigators as associate investigators. Gradually a few larger projects have been decided upon, chiefly of a scientific nature, and these have now been advanced sufficiently to use up the resources of the Institution for some time to come.

The Institution, too, has developed along lines somewhat different from what was at first expected, and what was indicated in Mr. Carnegie's deed of trust. It has gradually evolved into a distinctively research institution of the highest rank, giving up any attempt to fulfill the functions of a national university at Washington. Its present purpose is to aid in the investigation of the more difficult problems in the better organized fields of knowledge; to use the income in providing facilities for such investigation; and in publishing the results. A few small individual grants are still made, but the tendency is to diminish these. The present scope of the work of the Institution is indicated by the nature of the permanent investments for the departments now supported, and by the work they are doing. The figures are for the year 1909–1910, and are taken from the *Year Book* published in February, 1910. (1) Department of Administration, located at Washington, D.C. Permanent central offices. Investment in buildings, site, and equipment, $254,419; maintenance for year, $45,000. (2) Department of Botanical Research. Headquarters, Desert Botanical Laboratory, at Tucson, Ariz. Investment in plant, $34,706; appropriation for year, $32,000. (3) Department of Experimental Evolution. Headquarters, Cold Spring Harbor, Long Island, N.Y. Investment in plant, $46,006; appropriation for year, $29,000. (4) Geophysical Laboratory, Washington, D.C. Investment in plant, $173,223; appropriation for year, $45,000. Work, — a systematic study of the origin and transformation of the rocks of the earth's crust. (5) Department of Marine Biology. Headquarters, Tortugas Island, Fla., Investment in plant, $23,344; appropriation for year, $15,000. Also supports two research tables at Naples. (6) Department of Meridian Astronomy. Headquarters have been at the Dudley Observatory, Albany, N.Y. A temporary observatory is now being established in the southern hemisphere, at San Luis, Argentina. Investment in plant, $15,599; appropriation for year, $30,000. (7) Department of Terrestrial Magnetism. Investment in ship and equipment, $138,960; appropriation for year, $60,000. Work, — preparation of a catalogue of standard star positions. (8) Solar Observatory, Mt. Wilson, and Pasadena, Cal. Investment in plant, $403,611; appropriation for year, $104,000. Work, — investigation of solar phenomena. (9) Nutrition Laboratory, Boston, Mass. Investment in plant, $117,030; appropriation for year, $25,000. (10) Department of Economics and Sociology. Appropriation for year, $17,500. Investigations in population, agriculture, mining, manufactures, transportation, commerce, money and banking, labor movement, industrial organization, social legislation, taxation and finance, and the status of the negro. (11) Department of Historical Research. Appropriation for year, $20,500. Preparation of catalogues of documents relating to American history in the libraries of the world. (12) Publication of Investigations. Annual appropriation, $50,000. 118 volumes had been issued up to the close of 1909. (13) Minor grants to investigators and institutions to assist in carrying on researches in: archæology, astronomy, bibliography, botany, chemistry, mathematics, meteorology, paleontology, physics, and zoölogy. Appropriation for all of the above, $43,000 for the year. E. P. C.

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Year Books of the Carnegie Institution of Washington, 1902–1909.

CARNEGIE TECHNICAL SCHOOLS, PITTSBURG, PA. — A coeducational institution founded by Mr. Andrew Carnegie with an endowment of $1,000,000, increased at the dedication exercises of the schools to $4,000,000. The schools are ultimately to be housed in 5 buildings, all of which, with the exception of a new building for the School of Applied Design, are now completed. Four departments — the School of Applied Science, the School for Apprentices and Journeymen, the School of Applied Design, and the Margaret Morrison School for Women — are maintained. The United States Geological Survey has established in Machinery Hall the main laboratory of the Chemical Division, Technologic Branch, where investigations of fuels from all parts of the country are conducted. The courses in the schools are arranged for day and night students.

In the School of Applied Science no student is permitted to take up any specialty until he has completed a preliminary training in English, mathematics, physics, chemistry, drawing, and shop practice. On completion of this training students may concentrate on their particular branch within the fields of engineering and chemical practice. The time to be taken over any course is not fixed, but depends on the aptitude and application of the individual students. Candidates over 16 who have had a high school or equivalent preparation are admitted on certificate from high schools and an entrance examination in fundamental subjects. Courses are given in the night similar to those given during the day, and admission requirements are the same. In 1907–1908, 571 students were enrolled in the day and night courses of this department.

The School for Apprentices and Journeymen aims to give general training to supplement the usual apprenticeships in order to counteract the dangers of specialization and over-emphasis of the practical as opposed to the theoretical sides. A day industrial course is offered to meet the demand for proficient men in the machinery and building trades. Here an opportunity is given to men to enter the course for part of the year only and to take up employment for the rest of the year. The admission requirements are very elastic. No definite period for completing the course is assigned. In the same department night trade courses are offered for apprentices and journeymen already engaged in a trade, preferably that which they wish to study. In 1907–1908, 641 students were enrolled in the different courses of this department.

Two courses — architecture and interior decoration — are offered in the School of Applied Design. A valuable adjunct to the department is the Carnegie Library and Institute. Candidates are admitted by certificate of a high school or equivalent preparation and an entrance examination in subjects fundamental to the courses. Others are admitted to take the courses after the preliminary training in the applied school of science, or on account of maturity, practical experience, or other satisfactory reasons. Night courses are provided. In 1907–1908, 114 students were enrolled in this department.

The Margaret Morrison Carnegie School for Women is designed primarily to give training in the home-making arts and secondly in technical subjects. A general course of one year is given as a foundation for specialization. The specialized courses include household arts, dressmaking, costume design, and secretarial work. Candidates over 18 years of age are admitted on a personal interview and entrance examination, those under 18 only on giving evidence of having had at least 2 years of high school or equivalent training, and an entrance examination. Night courses are also offered. Four hundred and six students were enrolled in this department in 1907–1908. Tuition fees are charged in all departments, being in all cases lower for residents of Pittsburg than for others. Arthur A. Hamerschlag, Sc.D., is the director.

CARPENTER, MARY (1807–1877). — Philanthropist and educator. Her father, Dr. Lant Carpenter, was a Unitarian divine and schoolmaster, and Miss Carpenter not only studied under him, but taught in his place when occasion demanded. After acting as governess for some years Miss Carpenter returned to Bristol and opened, in conjunction with her mother, a school for girls, and superintended a Sunday school. In 1840 she turned her attention to the education of poor children, for whom she opened a ragged school (*q.v.*), and to the condition of juvenile offenders. A book which she wrote in 1857 on the need of reformatories led to a conference in Birmingham in the same year. This movement resulted in legislation in 1854. In 1856, in order to test the system which she had formulated, she opened a reformatory. Throughout this period she did not relax her interest in ragged schools, but urged on the government the need of grants for such schools. In 1859 she opened a day industrial school (*q.v.*). From 1866 to her death Miss Carpenter devoted the great part of her efforts to female education in India and prison reform in England and Canada. She made several visits to India, and always made reports to the government. During one of these visits she superintended a normal school in Bombay. In 1873 she visited America, where she spoke on and interested herself in prison reform. Before her death she had the satisfaction of knowing that Parliament had sanctioned the provision of day industrial schools by school boards. Miss Carpenter died in 1877. The most important of her numerous writings deal with ragged schools and the treatment of juvenile offenders. In 1849 she published *Ragged Schools, their principles and modes of operation by a worker;* in 1859, *The Claims of Ragged Schools to pecuniary educational aid from the annual parliamentary grant;* in 1861, *What shall we do with our Pauper Children?* On the other subject of her interest there appeared in 1851 *Reformatory Schools for the Children of the perishing and dangerous classes and for juvenile offenders;* in 1853, *Juvenile Delinquents, their condition and treatment;* in 1864, *Our Convicts, how they are made and should be treated.*

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CARPENTER, NATHANIEL (1589–*c.* 1627). — An English schoolmaster who was M.A. and D.D. of Oxford University (Exeter College) and is described as a " noted philosopher, poet, mathematician, and geographer." He was appointed, through Archbishop Ussher, schoolmaster of the King's Wards in Dublin, children of Roman Catholic parents. Wood, in the *Athenae Oxon.*, states that on his deathbed Carpenter regretted that he "had so much courted the maid instead of the mistress," meaning that he had spent his chief time in philosophy and mathematics instead of in divinity. Carpenter's important work on *Geography,* " containing the sphericall and topicall Parts thereof," was published at Oxford in 1625 (4to, 285 pp.). The first is mainly mathematical geography, but the second is largely what we now call human geography. For instance, he points out that the " natural bounds are more certain than artificial," and discusses the " qualities of a region," " the disposition of inhabitants in respect of the site," of the effect of education in overcoming geographical limitations, of " the mixture of colonies in the same nation." Carpenter has interesting criticism on the value of navigation in the increase of knowledge and riches and the comparison of the East and the West in learning. He is especially eloquent in speaking of the people of his own native country of Devon, as illustrative of the effect of the hill countries on the development of warlike and generous qualities, and speaks of Gilbert, Hawkins, Frobisher, etc. " whose names live with the Ocean."

The date (1625) makes much of the subject matter significant. F. W.

CARPENTER, STEPHEN H. (1831–1878). — Educator, graduated at the University of Rochester in 1854. He was 6 years instructor in the University of Wisconsin, and 2 years assistant superintendent of public instruction in Wisconsin (under Henry Barnard). He was subsequently professor in St. Paul's College, Mo., and from 1871 to 1878 president of the University of Kansas. Author of *Moral Forces in Education* and of several textbooks on English grammar. W. S. M.

CARROLL COLLEGE, WAUKESHA, WIS. — A coeducational institution founded as a high school in 1846 and reorganized in 1903 for full college work. It is under the auspices of the Presbyterian Synod of Wisconsin. Academic, collegiate, and musical departments are maintained. Admission to the college is by certificate of an accredited high school or by an examination requiring 15 units of high school studies. Degrees are conferred in arts and science courses. There is a faculty of 12 professors and 10 instructors and assistants. Rev. Wilbur Oscar Carrier, M.A., D.D., is the president.

CARSON AND NEWMAN COLLEGE, JEFFERSON CITY, TENN. — A coeducational institution since 1889, established, in 1851, under Baptist control. Preparatory, collegiate, musical, and business departments are maintained. The college courses are based on approximately 8 points of high school work. Degrees are conferred. There are 12 professors and 10 instructors and assistants.

CARTER, JAMES GORDON (1795–1849). — One of the originators of the normal school movement in America, was born at Leominster, Mass., on Sept. 7, 1795, and was graduated from Harvard College in 1820. He engaged in private school work, and in 1821 published *Letters to the Hon. William Prescott on the Free Schools of New England, with Remarks on Principles of Instruction*, in which he pointed out the defects in education which were later made the basis of the reforms of Horace Mann. In 1827 he presented a petition to the Massachusetts legislature asking for an appropriation for the establishment of a state normal school. The bill was presented by William B. Calhoun (*q.v.*), and was lost in the senate by one vote. He then opened a private normal school at Lancaster, and for several years did what he could to arouse an interest in the professional training of teachers. He was chosen a member of the Massachusetts legislature in 1835, and drafted the bill that established the State Board of Education. He was active in the organization of the American Institute of Instruction (*q.v.*) and contributed numerous articles on education to the *Literary Gazette*. He died at Chicago on July 21, 1849. W. S. M.

CARTHAGE COLLEGE, CARTHAGE, ILL. — Founded in 1870, and conducted under the auspices of the General Synod of the Evangelical Lutheran Church in the United States. The constitution is coeducational, and maintains academic, collegiate, Bible training, and fine arts departments. Admission is on certificate of accredited high schools or by an examination requiring about 14 units of work. Classical, scientific, and literary courses are given in the college, and lead to the appropriate degrees. There are six professors and eight instructors.

CARTHUSIANS. — See ABBEY SCHOOLS; CONVENT SCHOOLS; MIDDLE AGES, EDUCATION IN; MONASTIC SCHOOLS; MONASTIC RULES, EDUCATIONAL PROVISIONS IN.

CASAUBON, ISAAC (1559–1614). — A classical scholar of some note. He was born in Geneva, the son of a Huguenot pastor, who supervised his education. Casaubon received no organized education until he was 19, when he entered upon studies at Geneva, learning Greek from a Cretan, Franciscus Portus, who recommended him as his successor. He was appointed professor of Greek at Geneva in 1582. But although holding a public appointment, his interests were mainly in private study, to which he devoted every minute that he could spare. He was connected by his first marriage with the printer, Henri Estienne, who, however, refused to give him access to his Mss. His editions of classical writings won for him the friendship of the most famous scholars of Europe, including Joseph Scaliger. In 1596 he accepted an appointment in Montpellier, where he lectured on a great variety of subjects connected with the classical studies. In 1600 he moved to Paris, where he held the position of a *Lecteur du Roi* and received a pension, but could not obtain a chair in the university owing to his Protestant leanings. In 1604, however, he received an appointment in the Royal Library, where he lost no time in untiring study of the Mss. to be found there. Attempts were made throughout this period to convert him, for political and personal reasons, to Roman Catholicism, but without success. But on the death of Henri IV he lost his patron, and, because his religious views now inclined to Anglicanism, he accepted a call to England, where he received a prebendal stall in Canterbury and was received with great kindness everywhere. He won the interest of the King, James I, who bestowed a pension on him and frequently employed him as his companion. Casaubon became naturalized in England, which he called the "island of the blest." He died in England four years after his arrival. His early death was hastened by a neglected constitution due to untiring devotion to his studies.

He left some 25 publications on classical subjects. His interests were mainly in the historical and biographical. History and biography he regarded as sources of political and ethical philosophy. The work which first brought him a European reputation was his edition of Theophrastus (1592), although his earliest work on Strabo, of which he said he was ashamed, is still unsurpassed. Among his other editions are those on Athenæus, Suetonius, Persius, and Polybius (unfinished). It was a maxim with Casaubon that one only knows so much as one remembers; hence he made short notes of all that he read, and the result is contained in 60 volumes of *Adversaria*. In 1597 he began an interesting diary, *Ephemerides*, which he continued until shortly before his death, and which was edited by his son.

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CASE METHOD OF INSTRUCTION. — See Law, Education in.

CASE SCHOOL OF APPLIED SCIENCE, CLEVELAND, OHIO. — Founded in 1880 as the result of an endowment left by Leonard Case for the purpose of establishing a scientific school. Instruction was begun in 1881 in a temporary building, and transferred to new buildings in 1885. The location in an important industrial center offers considerable advantages to an institution which aims to give technical training. Courses are given in physics, chemistry, and engineering (civil, railroad, structural, mechanical, electrical, mining, and metallurgical). All students take the same studies in the first year, and specialization increases from the second year to the end of the course of 4 years. Candidates for admission must have graduated from a preparatory school with a 4 years' course requiring at least 14 units for graduation, and pass an examination in 14 units of high school work. Degrees are conferred on the completion of courses and presentation of a thesis. The institution is accepted by the Carnegie Foundation for the Advancement of Teaching. There are 23 professors and 16 instructors on the faculty. Charles Sumner Howe, Ph.D., D.Sc., LL.D., is the president.

CASSIAN, JOHN. — Early Christian theologian, born about A.D. 360 and educated in a monastery at Bethlehem, under the tutelage of the Abbot Germanus, in all the learning of the East. In 390 they made a pilgrimage amongst the hermits of Egypt, and found the life of retirement from the world so attractive that they remained there 7 years. They then went to Constantinople, where Cassian became a disciple of St. Chrysostom (*q.v.*), the greatest preacher and teacher of the day. Under his instruction he became one of the ablest and soundest theologians of the early Church. After the overthrow of St. Chrysostom Cassian went to Rome, where he distinguished himself as one of the chief champions of the Christian Faith. One of his pupils, Vincent of Lerins, won a foremost place amongst the Latin fathers, and he himself, at the instance of Leo the Great, wrote an important treatise *On the Incarnation*, in opposition to the Nestorian and Pelagian heresies. He steered a safe course between the Scylla of Augustinian exaggerations and the Charybdis of Pelagian errors and was regarded as the founder of Semi-Pelagianism. The sack of Rome by Alaric drove him out from the world and back to monastic life. He founded two monasteries at Marseilles (one for men and the other for women), and thus introduced the monastic system into the Western Church. Upon the lines laid down by him monasticism (*q.v.*) took on a more highly organized form in the West than in the East, and profoundly influenced the life of the Church and the world for many centuries. The Latin fathers fostered education from this time onward, and became the intellectual leaders of the world. Connected with every cloister was a school where the lamp of knowledge was kept burning and systematic courses of study were pursued. The curriculum was not confined to religious literature, but included all the liberal arts and the classic authors. This great system was based chiefly upon the writings of John Cassian, in which he laid down the fundamental principles of monasticism for all time. Two volumes of these have been preserved: *De Coenobiorum Institutis*, in 12 books, in which he lays down the external rules of the ascetic life and describes its inner experiences; and *Collationes Patrum*, in which he relates his observations of monastic life in Egypt, translated in the *Library of Greek and Latin Fathers*, Vol. XI, Scribners, N.Y. W. R.

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CASSIODORUS, or, more fully, **MAGNUS AURELIUS CASSIODORUS SENATOR.** — A descendant of a family which had for three generations been distinguished in political circles at Rome, was born, probably at Scyllacium in Bruttium, about A.D. 477. He was a contemporary of the famous Boethius (*q.v.*), whom, however, he long survived. His mind appears to have been as practical as that of Boethius was idealistic. Having the advantages of the best education that the times could afford, Cassiodorus was able to gain the particular favor of King Theodoric by a panegyric which he composed in his honor. At 20 he was quæstor, and afterwards became consul. Under the successors of the Gothic king, down to and including Vitigis, Cassiodorus retained his political eminence, which he deserved by reason of his enthusiastic support of the policy of Theodoric to weld the Goths and Romans together into a single people.

But more important to education than his political activities is the period of the retirement of Cassiodorus to a cloister which he had himself founded at Vivarium, in Bruttium. It was in 540 that he betook himself to its pleasant gardens and books, and from this time forth, to the advanced age of 83, he devoted himself to the endeavor to make the monastery the home of learning. Accordingly Cassiodorus first devised a monastic rule in which the substitution of mental for physical labor was permitted and even encouraged. What literary activity was carried on in the western monasteries during the early Middle Ages can trace its inception to Cassiodorus.

The most influential of his writings was his *Institutions of sacred and secular learning* (*Institutiones divinarum et saecularium lectionum*). The book was intended, as the preface intimates, to supply the need of a theological school for the monks. The second part is the more interesting from the standpoint of a student of education, since it contains an abridged treatment of the seven liberal arts, consisting in part, however, of mere extracts, intended according to the author for the simple unlettered monks who had not studied the profane sciences. The *Institutions*, written about the year 544, underwent a later revision at the hands of its author. He wrote also *Complexiones in epistolas et acta apostolorum et apocalypsia*, and a more important *Historia ecclesiastica tripartita*, in 12 books, which became the principal manual of theological history for the Middle Ages, but which is founded upon the three ecclesiastical histories of Socrates, Sozomenus, and Theodoret. The *Variae* (*epistolae*) of Cassiodorus contain a convincing testimony of his political activities. Finally his *De Anima* completes the circle of his literary activities by an excursion into the field of philosophy. The quality of the soul he determines to be *light*, because it is made in the image of God. Cassiodorus is one of the few great "transmitters" who kept alive the embers of classical learning for western Europe.

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CASTELLION (CASTALIO, CASTELLIO, or CHATILLON), SÉBASTIEN (1515–1563). — The successor of Maturinus Corderius (*q.v.*) as schoolmaster at Geneva in 1541, when Corderius had gone to Neuchatel. Castellion was the great prophet of the principle of religious toleration. The *De Haereticis* was first published in 1559, and in this work against compulsion in religious matters, Castellion was one in a joint authorship about which there is discussion. (See Buisson: *Castellion*, Vol. II, ch. 13.) Castellion edited a number of Greek classics, and made translations of the Bible in Latin and in French, but his educational work, the *Dialogi sacri*, was most widely known. Its circulation was immense. M. Buisson names over 130 editions, of which 18 were published in London. These *Dialogues* or *Colloquies* are all biblical in subject, and attempt to bring into the schools scriptural stories, with the ease and grace of the Latin Colloquies which dealt with similar subjects. In Huguenot and Puritan schools they were constantly included in the curriculum. In English schools they were often required to be part of the curriculum, by statute, *e.g.* at St. Saviour's Grammar School, Southwark (Orders 1562), Rivington Grammar School (Statutes 1564), Sandwich Grammar School (Statutes 1580), Camberwell Grammar School (Statutes 1615), and they were used in 1628 at Westminster School. They are written in a remarkably simple, natural style (in Latin) suitable for children. They thus served the double purpose of the Colloquy as a school method to teach Latin and the subject matter of the Bible at the same time. The first complete edition (4 books) of Castellion's *Dialogi Sacri* was published in 1551 at Basle; the first London edition (in Latin) was 1573. The first edition in French, *Dialogues Sacrés*, was published at Basle in 1555. In 1715, 119 of these dialogues were published in English at London. See article on Colloquies.

F. W.

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CASTIGLIONE, BALDASSARE. — Courtier and diplomat, born at Casatico near Milan, Dec. 6, 1478. He studied in Milan under George Merula and Demetrius Chalcondylas. As a youth he entered the service of Ludovico il Moro; but in 1499, on Ludovico's downfall, he attached himself to the Marquis Francesco Gonzaga, with whom he campaigned until the defeat of Garigliano (1503); after which, to Gonzaga's indignation, he transferred his allegiance to Guidobaldo di Monte Feltro, Duke of Urbino. After a brief campaign against Cesena in behalf of the Pope, in which Castiglione commanded 50 men, he took up attendance at the court at Urbino (1504), remaining there until Guidobaldo's death (1508), except for a trip to London (1506) to receive for the Duke from Henry VII the order of the Garter. By Francesco Maria della Rovere, Guidobaldo's successor, he was appointed Governor of Gubbio; and after the war of Julius II against the

Venetians, in which Castiglione fought under della Rovere, he was rewarded with the castle of Novillara, near Pesaro, and was made Count (1513). During nearly the whole of the pontificate of Leo X he was ambassador at Rome. When Leo confiscated the Duchy of Urbino for his own nephew, Lorenzo de' Medici (1516), Castiglione went back to his former patron, now appeased, the Marquis Gonzaga. At Mantua the same year he married Ippolita dei conti Torelli, who four years later died, leaving him three children. Thereafter he vibrated between Mantua and Rome, until in 1524 Clement VII sent him as ambassador to Charles V. While he was at the Spanish court the imperial troops under Bourbon sacked Rome and imprisoned the Pope (1527). Castiglione was stricken with grief and shame. Though the Emperor accepted him as a Spanish subject and offered him the bishopric of Avila, and though the Pope absolved him from blame, he died unconsoled at Toledo, Feb. 7, 1529. His body was taken to Italy, and buried in the Church of the Madonna delle Grazie near Mantua. Soldier, courtier, diplomat, poet, Italian and Latin, Castiglione's lasting fame yet rests on *The Book of the Courtier*, a prose dialogue in 4 books. According to himself, the work was written as an *In memoriam* to Guidobaldo, and *in pochi giorni*. Although by 1518 he had submitted the manuscript to Bembo, Sadoleto, and others, he published it only in 1528.

Ostensibly the book reports certain conversations at Urbino in 1506 (while Castiglione himself was in England) between the Duchess Elizabeta Gonzaga, Emilia Pia, and various gentlemen of note in society and letters. Subject to the criticism of the rest, four chosen spokesmen respectively draw the right courtier as to character and conduct, the right court lady, and the right prince, — and the right relations of the courtier to each. The guiding principle of the resulting social structure is æsthetic. Living is conceived as a fine art. The courtier's essential attribute is grace; the court lady's, graciousness. Their only religion is a religion of beauty. Platonic love of beauty motivates the courtier's many-sided accomplishment; his accomplishment in turn at once adorns the court and serves the State. It is the humanistic rendition of chivalric *prouesse* with *courtoisie*. Castiglione's Courtier is the medieval *chevalier sans peur et sans reproche* at once subtilized and humanized by the " sweetness and light " of classical culture. And the *Book of the Courtier* depicts him even more effectively dramatically than didactically: it is the first salon picture of modern society.

Translated into Spanish by Boscan (1534), into French by Colin (1537), into English by Hoby (1561), the book dominated European culture for the century. In England, praised by Ascham, Castiglione's ideal was emulated by Lyly in his *Euphues*, by Spenser in the *Faerie Queene*, by Sidney in his own living. It produced a host of imitative conduct books, from the *Governour* (1531) of Elyot (*q.v*) to *The Compleat Gentleman* (1634) of Peacham (*q.v.*), and *The Compleat Gentleman* (1630) and *The Compleat Gentlewoman* (1631) of Brathwait (*q.v.*). After the Reformation and the Catholic reaction, however, Castiglione's æsthetic paganism became impossible; and the problem of his imitators and emulators was to reinfuse his system with Catholic or Protestant orthodox piety. Thus Spenser in the *Faerie Queene*, to " fashion a gentleman or noble person in vertuous and gentle discipline," does so by superimposing upon Castiglione's romantic Platonism a rigid Calvinism. While Spenser, again, formally declares the " court and royal citadell " to be " the great schoolmaistresse of all courtesy " (*F. Q.* III, vi, 1), he really extends the concept of " courtier " into that of " nobleman," as the writers of the following generation, such as Peacham and Brathwait, at least tend to extend it into that of " gentleman," not necessarily attached to any court.

J. B. F.

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CASTING OUT NINES. — See Checks on Computations.

CASWELL, ALEXIS (1799–1877). — Educator and author, graduated at Brown in 1822. He was two years professor in Columbian University at Washington, thirty-five years a professor at Brown University, and from 1868 to 1872 president of that institution. He was one of the founders of the American Association for the Advancement of Science (*q.v.*). Author of *Life of Francis Wayland*, *Textbook on Astronomy*, and of numerous scientific papers.

W. S. M.

CATALEPSY. — A nervous condition in which the muscles are held tense, so that either a limb or the whole body is motionless, rigid, and immovable, or the parts retain any position in which they may be set. The position which is assumed by the patient or that imposed by a bystander lasts for a much longer period than is possible by any effort of the will in a normal individual, and the patient appears like a manikin with hinged joints. The condition in which the imposed positions are retained is, for obvious reasons, sometimes called *flexibilitas cerea* (waxy flexibility). The latter condition is found in a number of mental and nervous diseases (dementia precox [*q.v.*], hysteria [*q.v.*], etc.), and a similar state has been described as one of the stages in hypnotic sleep. Both forms of catalepsy, the rigid and the flexible, have been explained as the effect of abnormal suggestibility, and they appear to be allied to and sometimes accompanied by two other states resulting from an increased suggestibility, viz. (1) *echolalia* (*q.v.*), in which there is a repetition of sounds or words or phrases that have been heard by the patient, and (2) *echopraxia,* in which the patient repeats movements he has seen. Both in hysteria and in dementia precox the symptom may last for days, but in the former disease it is usual to find it of much shorter duration. The term "catalepsy" is sometimes, but incorrectly, used as the name for abnormal sleep states of the nature of trance, but for the latter the term "narcolepsy" (*q.v.*) is used. S. I. F.

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CATANIA, UNIVERSITY OF. — Established in 1437, and by a Papal bull of 1444 raised to the level of Bologna. It was opened in 1445. Until 1805 it was the only university of Sicily, but at that date the University of Palermo was established. Faculties of law, medicine, arts, and sciences are maintained. In 1909–1910 there were enrolled 1160 students.

See ITALY, EDUCATION IN.

CATAWBA COLLEGE, NEWTON, N.C. — Opened in 1857 under the auspices of the North Carolina classis of the Reformed Church in the United States. Academic, collegiate, and musical departments are maintained. The college courses — classical, scientific, and literary — are based on about eight points of high school work, and lead to their appropriate degrees. There are 6 professors on the faculty of the college.

CATECHETICAL METHOD. — See CATECHISM; CATECHETICAL SCHOOLS; SOCRATIC METHOD; TEACHING, METHODS OF.

CATECHETICAL SCHOOLS. — Those schools for religious and general education which were established in various parts of the Christian world in the second and third centuries, and in connection with the Church. In this respect they differed from the private schools conducted by such teachers in the Church as Justin Martyr, Tatian and others. In some cases the Catechetical Schools may have been an outgrowth of the courses of instruction given to catechumens. But they differed in many respects from so-called Catechumenal Schools (*q.v.*), in that their aim was general culture as well as religious training; heathen as well as Christians were admitted to them; and they were rivals of the secular schools. The name "Catechetical Schools" implies merely instruction, possibly in the form of lectures such as were delivered to catechumens, *i.e.* persons under instruction. The only connection with the word "catechism" is that the latter term has been applied to simple textbooks of religious instruction which happen to be arranged in the form of question and answer. The most important and influential of these schools was undoubtedly Alexandria (*q.v.*), but there were other schools, such as the school of the Monarchians at Rome, and the schools of Edessa, Cæsarea, Antioch (*q.v.*), and Nisibis. All of these developed a large activity and played an important part in the educational work of the Church, especially in the education of the clergy.

The School of Alexandria seems to have been the first established. Its foundation is obscure, but it may well be placed in the first half of the second century when the Gnostic schools were still flourishing in that city. It was especially to counteract the heathen schools of Alexandria that it was later fostered by the church of that city. The first teacher whose name is known was Pantænus (*c.* 180 to 200), a Stoic philosopher converted to Christianity. He was succeeded by his colleague, Clement of Alexandria (*q.v.*) about 200, and he in turn by Origen (*q.v.*) in 202. Heraclas became head for a short time after Origen, whose assistant he had been, and then followed Dionysius (*q.v.*) in 232, who remained head after becoming Bishop of Alexandria in 247. The list of later heads of the school is not wholly certain. The traditional list is as follows: Theognostus, Pierius (282 to *c.* 300), Serapion, Peter, Macarius, Didymus the Blind (*c.* 340 to 395), and Rhodon.

The curriculum covered the whole range of sciences as then studied, all branches of rhetoric, and the various systems of philosophy except the Epicurean. The study of the Bible was very thorough, and Origen while head of the school devoted himself especially to that branch. The school broke up in the first Origenistic Controversy under Theophilus of Alexandria (385–412) when Rhodon, the last head of the institution, left the city and settled and taught in Sida.

Contemporaneous with the flourishing period of the School of Alexandria was the School of the Monarchians at Rome, under Theodotus the Leather Worker, a teacher from Byzantium, and Theodotus the Money Changer, his pupil and successor. This was not strictly a catechetical school; as it was not officially connected with the Church of Rome, and it seems to have been a private undertaking. It is, however, important in this connection, as it exerted an influence upon the early teachers of the School of Antioch (*q.v.*) The fortunes of the school of Theodotus after the death of the younger teacher of that name are unknown. The school was probably extinct by 250. It was a nursery of thoroughly scientific inquiry. The study of logic and mathematics stood in high favor, and the works of Aristotle, Euclid, and Galen (*qq.v.*) served as textbooks (cf. Eusebius, *H.E.* V, 28). Biblical studies were carried on in a critical spirit, and the exegesis was literal and grammatical, all characteristics of the School of Antioch. A catechetical school seems to have been established at Jerusalem by Alexander, bishop of that city (212 to 250), who had been a pupil of Clement and a warm friend of Origen. It is barely possibly that both these great Alexandrians taught there for brief periods.

At Cæsarea was a famous school which was probably in existence as early as 215, when Origen taught there for a short time, and certainly after 232, when, after his quarrel with Bishop Demetrius of Alexandria (189 to 232), he settled there permanently. Under Origen the School of Cæsarea was as flourishing as that of Alexandria, but after his death it rapidly declined. It was revived by Pamphilius (d. 309), who had studied at Alexandria under Pierius, the Origenist. Pamphilius especially labored to increase the library of the school. Among his pupils was Eusebius of Cæsarea, whose Ecclesiastical History bears witness on every page to the riches of the library Pamphilius brought together. A certain Thespesius is mentioned by Jerome (*De viris illustribus, c.* 113), as teaching in Cæsarea, probably in the school. His pupil, Euzoius (deposed 379), becoming bishop of the city, tried to restore the library to its earlier condition. Further traces of the school do not appear.

The importance of the School of Antioch increased as that of Alexandria and Cæsarea declined. Secular schools flourished in the city, and the head of one of these, Malchion, a teacher of rhetoric and a learned presbyter of the Church, took a leading part in the condemnation of Paul of Samosata. If he was the founder of the school, his successor, Lucian, who gave the lasting trend to the thought of the school, does not seem to have agreed in Paul's condemnation, for Lucian remained outside the communion of the Church for many years after Paul's downfall in 268. With Lucian was associated the presbyter Dorotheus, whose influence does not seem to have been very great. Lucian studied at Edessa and at Cæsarea, where he came under the influence of Origen's scientific spirit, if not of Origen himself; but traces of the theological views subsequently known as Origenism are not found in Lucian's teaching. His labors on the revised text of the Septuagint, based upon a minute comparison of the current version with the Hebrew, indicate the scientific character of the work done at this school. Lucian's text was in general use throughout the East from Constantinople to Antioch. Among his pupils were Arius and Eusebius of Nicomedia, the opponents of Athanasius. On account of this connection of the school with heresy, it suffered a partial eclipse until the latter part of the fourth century, when it was again flourishing and a center of theological study far more important than Alexandria at that time. Among its representatives were Diodorus of Tarsus (d. 394), Chrysostom (*q.v.*) (d. 407), Theodore of Mopsuestia (d. 429), and Theodoret of Cyrrhus (d. 457). How far the educational work of Lucian was carried on in a permanent institution is uncertain, but the unity of thought in the Antiochene theologians and the similarity of their exegetical principles in the earlier and later periods point to some common instruction and the probable continuity of the school.

The foundation of the School of Edessa dates from the middle of the third century, and was probably due to Bardasanes, under whom the Christianization of the city took place. Before the end of the century it was one of the leading schools of the Church. Here under a certain Macarius Lucian studied. It was, however, in its earliest period under the Gnostic influences of Bardasanes, whose connection with the Valantinians is very probable.

The School of Edessa appears to have languished during much of the fourth century, but was revived from Antioch, the center of Nestorianism, with which its fortunes henceforth became identified. In this way Edessa became the seat of education for the Nestorian clergy of Persia. Rabbulas, Bishop of Edessa (412–435), a fanatical opponent of Nestorianism, broke up the school in 432, but he was succeeded in the see by Ibas, a pronounced Nestorian expelled by Rabbulas ,who restored the school and brought it to a high degree of prosperity. His translations of the works of the Antiochenes, Theodore of Mopsuestia and Diodorus, had a marked and lasting influence upon the thought and scientific exegesis of the Syrian Church. In 489 the School of Edessa was destroyed by the Emperor Zeno in his attempt to destroy Nestorianism, but not before it had founded a number of minor schools, among them one at Seleucia on the Tigris. The School of Nisibis was founded by the Nestorians expelled in 489 from Edessa, and there were maintained the traditions of their teachers, for its inspiration was drawn from Theodore and Theodoret, and it flourished for centuries. At the beginning of the seventh century under the direction of Mana it numbered more than 800 students. It is to the School of Nisibis as the center of Nestorianism that much of the honor is due of making the translations of Aristotle (*q.v.*) and of Greek medical works into Syriac and from that language into Arabic, whereby Greek science was preserved among the Arabians, and through Spain came into the West. The study of Aristotle, although not in harmony with the theology which became dominant in the Greek and early Latin churches, was peculiar to the School of Antioch and its transmission to the schools of Edessa and Nisibis was of vast importance for the schools of the Arabians and later Western culture.

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CATECHISMS. — Imply a method of teaching, viz. oral instruction. The term is now usually restricted to elementary instruction which proceeds by a method of stereotyped questions by the teacher and answers by the pupil — though the term is equally appropriate if the questions are asked by the learner, as is said to have been done in the early Christian Church. The catechetical method is naturally very ancient, and prevailed in oriental countries from antiquity. It was used by the Jews, and the early Christians simply continued it with fresh subject matter. In England, it was employed in Anglo-Saxon times, in the *de Divisionibus Temporum liber* ascribed to Bede in many secular subjects, and throughout the Middle Ages, for religious instruction. It was the method for the teaching of grammar in the well-known *Ars Minor* of Donatus, the longest-lived grammar in history. The catechism was therefore found ready to hand by the religious supporters of Roman Catholicism and of Protestant Reformers when the life and death struggle began in competition for attaching the youth to the one side or the other. The catechism as a religious manual is therefore most closely connected with the post-Reformation movements in religion. The long Roman Catholic catechism (1566), an outgrowth of the Council of Trent, intended as the manual for the instruction of the clergy, has been translated from Latin into all the languages of Europe. It has been followed by many shorter local and special catechisms, also allowed by authority in the Roman Church.

The Protestant series of catechisms begins with that of Martin Luther in German in 1529. It is said by Lutheran writers that no book except the Bible has had a wider circulation. The so-called *Catechism* of Erasmus, translated into English in 1533, may be termed Catholic rather than either Roman Catholic or Protestant. It is now little known, but it has high value. Its remarkable independence of thought may be judged by the answer to the question, Why in the Lord's Prayer there is not desired everlasting life? The answer is: "Because it belongeth to good soldiers only to do the offices and businesses which their captain hath commanded and appointed them; taking no thought or care for their reward." In 1547 Erasmus' *Catechism* was required by ordinance to be in the possession of every boy in Winchester College. In 1536 Calvin wrote in the French language the famous *Geneva Catechism*, which he himself at once translated into Latin, and afterwards Henry Stephens, the great Grecian, translated into Greek. Altogether there are 373 questions. Its circulation was common in France, in the Netherlands, in Bohemia, in Scotland, and in England. The English translation is dated 1556, and it was regarded "as the best next book to the Bible." But it was too long to hold its place permanently. On it were based two other important Calvinistic catechisms: First, the *Heidelberg Catechism* in 1563, composed by Zacharias Ursinus and Caspar Olevianus; for it is claimed the greatest number of versions into other languages after the Bible, the *De Imitatione Christi*, and the *Pilgrim's Progress*. Secondly, the longer and the shorter catechisms of the Westminster Assembly, 1654. The *Shorter Catechism* is still the theological heirloom of Scotland, and is, says Dr. Schaff, unequaled "in its brevity, terseness, and accuracy of definition." Thomas Carlyle's opinion is often quoted, "The older I grow — and I now stand upon the brink of eternity — the more comes back to me the first sentence in the *Shorter Catechism* which I learned when a child, and the fuller and deeper its meaning becomes. 'What is the chief end of man? To glorify God and to enjoy him for ever.'"

In England the first *Book of Common Prayer* issued in 1549 contains the Church of England Catechism. Its authorship is uncertain. It was probably written either by John Poynet (afterwards Bishop of Rochester) or by Alexander Nowell, afterward Dean of St. Paul's. Both Poynet and Nowell wrote longer catechisms. Poynet's *Short Catechism* (1553) was required by royal injunction to be used by all schoolmasters in their schools. But the accession of Queen Mary caused the suppression of the *Catechism*, and Poynet fled to Strassburg. In 1570 Nowell wrote his *Larger Catechism* in Latin, which was immediately translated into English by Thomas Norton, the translator of Calvin's *Institutes*. Nowell's *Middle Catechism* was published also in 1570, in Latin, and translated also by Norton into English in 1572; and in 1573 Nowell published his *Catechismus parvus* in Latin, translated into Greek in 1574. These catechisms of Dean Nowell are of great importance, in connection with grammar school teaching, in all their forms, English, Latin, and Greek. For Nowell's catechisms were required by the Canons of 1571 to be taught in the schools, and the Canons of 1604, requiring all schoolmasters to teach in English or Latin the longer or shorter catechism, probably contain the reference to the same work, though the author is not named.

The Grammar School Statutes dated after the return of the exiles from the Marian Persecution lay stress on the teaching of catechisms. Thus the Statutes of Retford 1552, Caistor 1630, require the Common Prayer Book Catechism. Harrow Rules 1580 and Rivington Grammar School required Calvin's or Nowell's Catechism. Many require Nowell only. St. Paul's School in 1678 used Nowell's Catechism, Ursinus', *i.e.* the Heidelberg Catechism, translated into Greek by Henry Stephens, and the Church Catechism, "which," we are told, "no other ought to exclude." The universities also required the students by statute to be tested in the catechisms, for example in 1578 in the University of Oxford, the catechisms of Calvin and Bullinger were prescribed. Catechisms, then, were used universally in the schools. "Multitudes of little catechisms" were produced, some only local, others more general, in addition to the authoritative and well-known English and foreign manuals. James I, at the Hampton Court Conference, made the well-known gibe that in Scotland "ignorant" catechisms were devised "by everyone who was the son of a good man."

Brinsley in 1612, in the *Ludus Literarius*, describes the method of teaching the catechism. It is to be taught every Saturday as a "preparation to the Sabbath" for half an hour or more. Each boy is to learn to repeat half a side of a leaf or more at a time until he can say the whole. The more they say at a time and the oftener, the better. After each has said the task, then a class is formed. Those "suspected to be careless" are then to give the "answers" to the questions. The teacher then makes each answer "so plain and easy" that the least child can understand. "Questions" are to be remade into shorter questions, and all are to be examined "backward and forward." All being answered, "all diligence" must be used "to whet it upon them, to work holy affections in them; that each may learn to fear the Lord and walk in all his commandments." From Charles Hoole's *New Discovery of the Old Art of Teaching School*, we learn that in the third form of the Grammar School the boys are to learn the Westminster Assembly's Catechisms in English and Latin. In the fourth form they use the Assembly's Lesser Catechism in Latin and Dr. Harmer's translation into Greek. In the fifth form, after the boys have gone thrice over the Assembly's Catechism in Greek and Latin, they "may proceed" in Nowell's Catechism or the Palatinate (*i.e.* the Heidelberg) Catechism in Greek. In the sixth form, the boys' catechisms are Nowell and Birkett in Greek and the Church Catechism in Hebrew. After the Restoration (1660) the use of the catechism for school purposes in Latin, Greek, and Hebrew gradually gave way to the shorter English Church Catechism in English. The establishment of charity schools in the early years of the eighteenth century, to the number eventually of 2000, led to the absolute supremacy in England of the employment for the school education of the vast bulk of the community, of the Common Prayer Book Catechism, so that the voluminous and multitudinous catechism of the sixteenth and seventeenth centuries fell out of use.

The catechism in the form of stereotyped questions and answers, whether religious or secular, has been in favor in ages when the cultivation of the verbal memory was regarded as a matter of great educational importance. And it is a mistake to suppose that the supporters of the method ignored the understanding of the subject matter. They insisted on it, as will be seen in Brinsley's method of teaching. But the closely thought-out exact statements were to the sixteenth and seventeenth centuries the best expressions of theological doctrines, and therefore, it was felt, ought to be known exactly, just as mathematical definitions and chemical formulæ are usually required nowadays to be learned *verbatim*. The objections ordinarily urged against the catechism method amount to this — that the learner *does not form his own conclusions*, but learns those arrived at by others on grounds which he does not understand, and that therefore he is not encouraged to use his own reason and judgment; in other words, his knowledge becomes mechanical and not rational. It is clear, too, that the control exercised by the teacher in having the questions stereotyped gives the lead in the question as well as in the answer, and takes away from the pupil the chances of putting the questions in the forms which would best satisfy his own individual difficulties. On the other hand, theological catechisms were not devised with a view to mental discipline. Their point of view is the communication of absolutely ascertained truth in the most compact, thorough, sound, exact statement of which it is capable. Accordingly, they usually fall into the educational fallacy of supposing that the shorter the statement is, the easier it is to learn. This is true only if we take "to learn" as meaning to repeat the words. Thus it is probably only the theological scholarly man who sees the full significance of the "Short" Catechism. It must, however, be remembered that in the Puritan times the atmosphere was fully charged with theological ideas, and that the catechism as a brief and exquisite statement of what was in the individual consciousness was filled out, even in children's minds, with a familiarity of knowledge of the Bible and Calvinistic doctrines to a degree which made the catechism much more vivid and real than we can readily understand. In a sense there was a "visualization" of the subject matter to which the modern world has no parallel. The modern attitude of openmindedness, and of *search* for truth, and the educational doctrine of the value of mental discipline, are thus on the whole in opposition to catechisms.

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For lists of the old Catechisms in England see Andrew Maunsell's *Catalogue* (1595) and William London's *Catalogue of the Most Vendible Books.* (Section on Divinity 1658.)

CATECHUMENAL SCHOOLS. — A term applied to that intellectual and moral training which candidates for admission to the Christian Church received before baptism. These candidates were, accordingly, known as catechumens, or persons under instruction. In the earliest period of the Church persons were often admitted after very brief preparation, but in the second century a period of probation and instruction became general, and handbooks of instruction, such as the *Didache*, began to appear. Although not members of the Church, converts not yet baptized were regarded as so connected with it as to be subject to ecclesiastical discipline, for they had been formally recognized as catechumens by the bishop and admitted to that status by a simple ceremony of laying on of hands. In case, therefore, the catechumen fell into gross sin, he was compelled to undergo a longer period of probation. Thus arose by the middle of the third century all the essential features of the system of instruction and discipline.

The catechumenate commonly lasted three years. There is little ground for making three or four clearly defined classes among the catechumens, a mistake made even by Bingham, which seems to have arisen from confusion with the penitential discipline; for persons under penance were often reduced to a position in which they had only the rights of catechumens. A natural division, however, was made between the general body of catechumens, commonly called *audientes*, because allowed to hear the sermon and the readings of the Scripture in the services, and those who, without being admitted to greater privileges as to attendance upon services, had formally applied for baptism, generally at the beginning of Lent, and were looking forward to baptism at the next Easter — Even. These, the *competentes*, received special instruction in a body. Just before baptism they were taught the words of the Creed or Symbol, with the doctrinal contents of which they had been made familiar, and also received the Lord's Prayer. Then, on baptism, they became full members of the Church and were admitted for the first time to be present at the Eucharist and to receive it. There was no special class whose duty it was to instruct the catechumens. The term catechist did not imply an order of the ministry, but a function which might be performed by any believer, clerical or lay. In the earliest period persons appear who later figure as sponsors, and these frequently undertook the instruction of the recent convert. Later the work naturally fell almost entirely to the clergy. Thus Cyril of Jerusalem (d. 386) (*q.v.*), whose catechetical lectures are still extant, acted as catechist probably both while a deacon and after his ordination to the presbyterate. The teacher, or *doctor audientium*, to whom Augustine (*q.v.*) addressed his textbook on catechetical instruction, belonged to the lower order of clergy known as lector. Bishops frequently took part in the instruction, and did so commonly in the preparation immediately before baptism. On the other hand, Cyril of Jerusalem encourages laymen to undertake the work (*Cat.* xv, 18).

As to the course of instruction covered during the catechumenate, there is for the Ante-Nicene period little evidence. The *Didache* probably served as a manual in various parts of the Church, and as models for other textbooks. Thus much of it appears in the Apostolic Constitution (Bk. VII, 1–32). The earliest body of carefully elaborated instruction is the series of Catechetical Lectures delivered by Cyril of Jerusalem in 347, covering the whole scheme of doctrine, as it had been formulated by the Church, and the fundamental points of Christian morality. These lectures are the most important extant document relating to the catechumenate, and are probably in the form in which they were actually delivered. The Great Catechism of Gregory of Nyssa (*q.v.*) is a highly technical exposition of theology conceived in the spirit of Origen (*q.v.*). It does not seem to have been used in instruction, for which it was hardly suitable, but was intended to serve as a guide to the catechist on the main points of doctrine. On account of its radical Origenism it could hardly have enjoyed great circulation. The work of Augustine, *De catechizandis rudibus*, is not a textbook, but a brief treatise on religious pedagogy, giving hints for dealing with different classes of pupils, pointing out stumbling blocks in the way of the teacher, setting before him ideals, and even presenting models of discourse.

The catechumenate attained its greatest development in the fourth and fifth centuries. The Church, free from persecution, then developed its organization in all points, and the catechumenal system was carefully regulated. Indeed, it is largely from this period that most information regarding the Church's institutions is to be gathered. It still remained the custom to baptize adults almost exclusively, even in the case of members of pious and devoted Christian families. The reason for this was that the forgiveness obtained in baptism applied only to the sins in the past. If baptism came later in life, it would avail for more wrongdoings and delinquencies. Men and women therefore applied for baptism who had never been heathen, and were familiar with the leading points of the faith. For them the grade of instruction could be much higher than if it were merely for children. The catechumenal system declined very rapidly with the general introduction of infant baptism. There was no place for it before baptism, and the children brought up in the Church and attending its services received their knowledge of the faith through the services of the Church. For some centuries the catechumenate remained only as a series of elaborate ceremonies connected with baptism. These were gradually simplified till but few traces remained. The place of this admirable system of instruction was but inadequately filled by preaching, which rapidly declined. And the Middle Ages, it may be said, never developed a system of instruction which approached in effectiveness the catechumenate of the early Church. With the Protestant Reformation and the Council of Trent some provision was made for popular religious instruction, especially of the young, and both among Protestants and Roman Catholics numerous Catechisms were compiled, and the clergy held accountable for suitable instruction in their cures. J. C. A.

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CATEGORICAL. — See Judgment.

CATHEDRAL SCHOOLS. — It has already been stated that all schools in western Europe are derived from the bishops' schools (*q.v.*). From the time that the bishop's council became a corporation apart from the bishop, with separate possessions, the bishop, being a person whose office necessitated perpetual movement in his diocese, even if he was not, as was very often the case, traveling in the service of the King, who rarely spent more than a week in the same place, devolved the control of his school on the chapter. They, being bound to statutory residence and service in the mother or cathedral church of the diocese, were better able to look after the cathedral school. This in process of time developed into three, and, in some cases, four schools, the theological school, the grammar school (*q.v.*), the song or music school (*q.v.*). and in later times, in some places, such as Lincoln and Salisbury, the choristers' school (*q.v.*), a grammar and song school combined. At first the one school had been originally taught by one of the canons, who was known as the schoolmaster (*Magister Scholarum*, *Scholasticus*, or *Archischola*). The song school was very early separated, and by the end of the eleventh century, when the constitution of cathedral churches was fixed, or at least became the subject of written statutes, had been placed under a separate officer, the cantor, chanter, or, as he was called from the thirteenth century, precentor. Though singing was regarded as quite as important for all cathedral ministers, and was for the services even more important than grammar, and the precentor, though a later creation, generally took precedence next the dean, yet the song school never was regarded as of the same importance as the grammar school; and the song schoolmaster occupied a much lower position than the grammar schoolmaster. The theological school became separated from the grammar school about the last quarter of the twelfth century. Though theology was the highest faculty, and indeed the ultimate end theoretically of all learning, yet the chancellor's (*q.v.*) own school never occupied as high a position as the grammar school, which he devolved on his deputy and appointee, the grammar schoolmaster. The grammar school of the Cathedral Church of N., or, as it was quite often called, the Grammar School of the City of N., was *par excellence* the Cathedral School. These cathedral schools were the public schools of the Middle Ages, and in England, even after the Reformation, continued to be the chief schools down to the eighteenth century. Even now, if they have been eclipsed by the select few of the old grammar schools, which are known as the Great Public Schools, and their modern imitators, the cathedral schools still remain among the chief of those public schools of the second rank which still retain the title, dropped by the others, of grammar schools. They were always for the city and county as well as for the members of the cathedral church itself. They taught not only grammar in the strict sense, but the classics in general, together with rhetoric and dialectic or logic, the *trivium* (*q.v.*) of the scholastic course. The earliest documents extant in connection with the cathedrals show us their importance. There were four principal persons or dignitaries in the cathedrals as organized in France, Spain, and Germany, as well as England, at the end of the eleventh century: the head, called in England dean, the precentor, the chancellor, and the sacrist or treasurer, and they ranked in that order generally. At St. Paul's, London, and perhaps some other places, the chancellor ranked second instead of third, as he had originally been second, before the bishop himself had been superseded by the dean. In England, the earliest of these documents is the *Institution of St. Osmund*, the foundation statutes of Salisbury Cathedral, which, though they only exist in a thirteenth-century copy, purport to be made in the year 1091, and are substantially, if not in every word, of that date. They state that the chancellor is preëminent in teaching the school and correcting the books, and that the Archischola, apparently the same person, has to hear and determine the lessons, keep the chapter seal, write the chapter letters, and draft the chapter deeds. There is every reason to think that the statutes of Lincoln Cathedral, founded in 1090, and those of York Cathedral, reconstituted in the same year, were in identical terms. At St. Paul's, London, the earliest extant document in which the school appears is in a confirmation, about the year 1111, by Bishop Richard to Hugh the schoolmaster (*Magistro Scholarum*) of the house previously occupied by Master Durand to hold it *ex officio* to him and his successors forever; and as Durand signs deeds as a canon as early as 1106, this brings the school back to that date at least. In about 1120 the same bishop granted to " Henry, my canon, the pupil of Master Hugh, the school of St. Paul's as honorably as the church in best and most honorable wise ever held it," and conferred on him some new endowments. King Stephen about 1137 conferred a special endowment, some churches in Hampshire, on the schoolmaster of Salisbury. At York the Archbishop about 1189 gave a separate endowment of 100*s*. a year out of the "synodals," or fees payable to the archbishop for synods, to the schoolmaster. But when the schoolmaster became chancellor, in about 1190 at York and about 1205 at St. Paul's, these endowments remained part of the chancellor's estate, and the grammar school as such became unendowed. Its master received generally a payment of £2 a year from the chancellor, adequate no doubt in 1190, but as it was never increased, wholly inadequate even by 1382, when £10 was the stipend assigned to the headmaster of Winchester. It appears from statutes at York in 1307 that the grammar schoolmaster was bound to be a Master of Arts, and held office only for three years, or by special grace for a fourth year. But after the Black Death in 1349, such was the dearth of M.A.'s that the chapter had to infringe the statute or custom and concur in the chancellor's making appointments for life or during good behavior. In the fourteenth century several of the York masters were not in holy orders, and were married men. The rector, as he is called, of the grammar school of Chichester, Master Thomas Romsey, who had been master there for ten years, became the second headmaster of Winchester College in 1395 — a sufficient evidence of the high status of that cathedral school.

In the fifteenth century, the customary stipend had become so insufficient, while the canon law directed that cathedral schools should be free at all events to the members of the Church and the poor, that other means were resorted to for paying the master. At Lincoln, in 1402, we find that the master was made a vicar-choral, *i.e.* one of the canon's choir deputies. At Wells the schoolmaster was also a chantry priest in the cathedral. At Chichester he was in 1460 also parson of St. Olave's Church in the city, a not very satisfactory arrangement. So in 1498 Bishop Story appropriated one of the canonries, or prebends of the cathedral, to that school, which is in consequence still called the Prebendal School. At Exeter, when the Reformation was in prospect, the chapter in 1636 proposed to reconstitute themselves as pastor and preachers instead of dean and canons, and to augment the grammar schoolmaster's stipend out of the chapter revenues to £20 a year, and establish a number of free scholarships. At York 50 free scholars attending the cathedral school were maintained by the neighboring abbey of St. Mary's. It was on these lines that, when the monkish cathedrals at Canterbury, Rochester, Durham, Worcester, Norwich, Ely, and Carlisle were abolished and secular canons introduced, and new bishoprics and chapters of canons established in place of the abbeys of Peterborough, Bristol, and Gloucester in 1540, the cathedral schools received a great accession. To each new cathedral chapter a grammar school was attached with master and usher receiving £20 and £10 a year respectively, with provision for free scholars to be lodged, boarded, and clothed free, ranging from 50 at Canterbury and 40 at Westminster to 20 at Peterborough, and, apparently, none at Gloucester, with extensive provision of exhibitions to take the best scholars on to the universities. This last provision was, however, afterward canceled by Henry VIII himself. While the schools of the cathedrals " of the new foundation," as they are called, benefited enormously by the change of religion, those of the old cathedrals suffered. For the abolition of chantries and the reduction of vicar-choralships left them to their old salaries eked out by tuition fees. York was saved by the annexation by Cardinal Pole of an old hospital or almshouse for poor priests to the school. Hereford received subsequent endowments from a later dean. Lichfield school was removed to a hospital in the city. But Salisbury and Wells cathedral schools gradually died of inanition, and York and Lichfield ceased to be regarded as cathedral schools. So that by an odd reversal and forgetfulness of history, when the great inquiry into and revival of secondary schools by the Endowed Schools Commission of 1863 took place, it was schools of the cathedrals of the new foundation which were regarded as the cathedral schools, and provision was made for assisting them out of the funds of the Ecclesiastical Commissioners, who now administer the estates of the cathedrals, while the others were disregarded. Westminster, which, owing to the abolition of Westminster Cathedral by Queen Mary and its revival by Queen Elizabeth as a collegiate church, is not regarded as strictly a cathedral school, was throughout the seventeenth and eighteenth centuries the largest, most famous, and most successful of the public schools. Of the rest York was long regarded as one of the chief schools of the north; Durham has been the most uniformly distinguished and successful; Canterbury was for many years sadly neglected and decadent, but has, since a new scheme was made for it by the Charity Commission, been revived, and has largely increased quite recently; Norwich and Hereford and Ely have been fairly successful as local schools; Bristol has been sadly lowered, and Chichester has been reduced almost to nothingness. A. F. L.

CATHOLICS AND THE PUBLIC SCHOOLS. — See Parochial School System.

CATHOLIC UNIVERSITY OF AMERICA, WASHINGTON, D.C. — A Catholic institution founded for the higher education of the clergy and laity. It was projected in 1866, but not founded until 1884. It received Papal Sanction in 1889, and the first classes were opened in that year. The university comprises five schools — sacred science, law, philosophy, letters, and science, each divided into departments. The majority of the departments are for graduate students only. A collegiate department was added in 1908, admission requirements to which are graduation from a high school. As a general rule candidates are not admitted to the graduate schools unless they have had a previous college or equivalent training. The degrees are conferred on completion of required courses and examinations. There are 15 professors, 8 associate professors, and 7 instructors on the faculty. The Very Rev. Thomas Joseph Shahan, S.T.D., J.U.L., is the pro-rector.

CATO, MARCUS PORCIUS, MAJOR (called **CENSORIUS** and **SAPIENS**) (234–149 B.C.). — Roman statesman famous for his opposition to the aristocracy and the introduction of Hellenic literature and foreign manners. Throughout his life an opponent of literary studies, he characteristically devoted himself to literature in his old age, took up the study of Greek, and became a prolific author. He laid the foundation for Latin prose literature. Much of what he wrote is now lost. One of the most important of his works was a history (*Origines*) in seven books, dealing not only with Roman but Italian history and the rise of Italian cities. This work is entirely lost. For his son he composed a work of encyclopedic character on agriculture, health, science of war, and jurisprudence. The only genuine extant work that can be ascribed to Cato is the *De Re Rustica* or *De Agri Cultura*, a guide to farmers, of which many echoes are found in Vergil's *Georgics*. Cato's friends adopted the practice of collecting his apothegms and moral sayings. In Cicero's time these had increased to quite a considerable collection, and additions were constantly made. These went by the name of *Disticha de Moribus*, and were all attributed to Cato. In the Middle Ages, owing to their content, they were a favorite school textbook, and in England were in use during the seventeenth century. Caxton and Wynkyn de Worde both published editions. Erasmus published one with notes. One of the earliest English translations was that of William Bullokar (*q.v.*) in 1585. Brinsley (*q.v.*) in 1612 and Hoole (*q.v.*) in 1659 issued translations in verse. Mulcaster objected to the use of the *Disticks* as a textbook in school, and with great justification, for they contain moral disquisitions and moral judgments on questions which are beyond the reach of schoolboys.

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CAUSATION. — Probably no idea or set of ideas has played as important a part in the history of philosophy as those connected with the conception of causation. Aristotle's analysis of every subject matter into four primary aspects or " principles " which exhaust all the points of view from which the subject can be intelligently discussed, was stated in terms of four " causes ": material, formal, efficient, and final. This doctrine was taken up into scholastic philosophy and educational procedure, and became part of the common intellectual heritage of European culture. Of the four notions, emphasis long fell upon the formal and the final causes, to the comparative neglect of material and efficient. The formal cause was the nature or essence, the universal character, which constituted anything *what* it is; in virtue of this universal character, the star is a star, man a man, etc. The final cause was the end and purpose for which it existed. Scholastic philosophy held that true science consists in knowing the *end* of things, their what for or reason why, and hence culminated in theology, knowledge of God as the final cause and good of the whole universe. Moreover, its method was essentially dialectical; observation and experiment directed upon nature were at a minimum; definition and the placing of rational concepts (*i.e.* formal causes) in logical relation to one another at a maximum.

With the Renaissance came a reaction against the scholastic philosophy, and against the whole doctrine of formal and final causes, which were either denied *in toto*, or else regarded as wholly sterile as respects knowledge of the facts of nature and history. Inquiry turned to efficient and material causation, *i.e.* an inquiry as to the processes by which things are brought into existence and the elements or constituents out of which they are made. Motion (or energy) soon became the generic term for efficient causes, matter (or mass) for material causes. So that it is a commonplace of present-day physical science that strictly scientific statements and explanations must be in terms of motion and matter.

Meantime the notion of efficient causation was subjected to criticism, till finally four theories regarding it were evolved: the skeptical, the a priori, the positivistic, and the pragmatic. The skeptical theory is best represented by Hume. According to him every distinct perception represents separate existence; continuity is thus essentially an illusion. Objectively there is no such thing; the mind gets accustomed to certain familiar recurrences and comes to expect that one thing will follow another. This subjective habit of expectation is all there is in causation. Kant, seeing in this interpretation of cause the destruction of all science, regarded causation as an a priori category in terms of which thought construes all the materials of experience, and without which no experience is possible. The positivistic notion eliminates efficiency and necessity from the idea of causation, and reduces it to uniform succession. We do not know and cannot know that the events are intrinsically connected or that one produces the other; but we may know that they are uniformly connected as antecedent and consequent, and this uniformity of sequence constitutes the whole content of causation. According to the pragmatic theory, the justification of the notion of causation is its service in giving control of future experience. Continuity is as much a fact of direct experience as is discreteness or separation. While there is no a priori assurance that any particular instance of continuity will recur, the mind endeavors to regulate future experience by postulating recurrence. So far as the anticipation is justified by future events, the notion is confirmed. So far as it fails to work the assured continuity is dropped or corrected. Because of its fruitfulness in regulating the occurrences of experiences, the general notion of causation is justified.

Of course, it is not necessary for educators to adopt any one of the various philosophic interpretations of causation. Teachers, however, have to take full account of the fact that modern science is based upon the principle of continuity of change, or process, and have to promote in pupils the habit of looking at and interpreting all subject matter from this point of view. The chief obstacles which have to be overcome are the tendencies to look at things as isolated and hence static, and to connect things on grounds of sense rather than evidence, and (often encouraged by textbooks, as a survival of the scholastic interest in formal cases) to consider intellectual demands satisfied when definitions and formal classifications have been learned. Insight into processes of causation affords assurance of independent intellectual progress, and represents the goal of educational procedure on its intellectual side.

J. D.

CAUTION MONEY. — A fee paid by undergraduates at Oxford and Cambridge to the tutors of their colleges, amounting to from £15 to £30, to ensure the prompt payment of all dues. The money is retained by the tutor so long as a student keeps his name on the books of the college, or until he compounds for his annual dues.

CEDARVILLE COLLEGE, CEDARVILLE, OHIO. — Chartered in 1887, but not opened until 1894. It is a coeducational institution under the auspices of the General Synod of the Reformed Presbyterian Church. Preparatory, collegiate, normal, and fine arts departments are maintained. Students are admitted to the freshman class of the college at 15 years of age. The college courses are based on approximately 8 points of high school work. The degree of Bachelor of Arts is conferred. There is a faculty of 10 professors and 3 instructors.

CENSORSHIP OF PUBLICATION AND OF READING. — See FREEDOM, ACADEMIC; INDEX OF PROHIBITED BOOKS.

CENSUS, SCHOOL. — In many of the states it has long been the custom for the state superintendent or other authority to obtain, among other types of information, statistics as to the number of children between certain ages in the various school districts, townships, and counties. Local authorities have sometimes made a careful census; often they have relied upon estimates or upon school enrollment. In distributing funds from state or county to the local district many states have adopted the plan of apportioning money according to educational need as expressed in the number of children to be educated. This has given rise to the school census in its more exact form. In these states local authorities are required to appoint a special census officer each year, and to provide the means necessary for an accurate census. "Padding the census" is sometimes resorted to in order to increase the appropriation. To offset this, names of all families are commonly now recorded: sometimes a descriptive blank must be filled out for each child. Special classifications must usually be made of the Chinese, Indian, or negro children, of the deaf, blind, etc. The "census age" varies among the states, sometimes including all the years, *e.g.* 5 to 21, during which youths may attend schools; or only the years, *e.g.* 6 to 15 or 17, during which they are most likely to attend. Not uncommonly the ages 4 and 5 are included, in order to get a measure of the numbers likely to attend school in the near future. In some cases the enumerator must also make a record of the school attended, whether the child can read and write, and in a few cases record also, for ages above 14, the kind and place of work followed. The cost of taking the census is fixed by statute in some states, the amount ranging from 2 cents to 10 cents for each name taken. The median rate for the 11 states thus fixing the rate is about 4 cents. In a variety of towns where the enumerator is paid by the day it is found that the median rate is slightly more than 5 cents per name taken.

The original purpose of the school census has been to provide a basis for the distribution of funds. In cities the data thus gathered has also been used to some extent in the endeavor to locate new school facilities, but especially in enforcing the compulsory education laws. Presumably a complete enumeration of children, with ages, would be quite serviceable in this direction. Practically, however, little use has been made of the census in this direction, owing partly to the fact that it is usually taken at a time of year which renders it unserviceable (often toward the close of the school year), or to the fact that its data are not made accessible to the proper officials. This has led to a discussion of the feasibility of enlarging the scope of the census so as to make of it a system of registration for school children. Obviously, in carrying out not only the laws on compulsory attendance (*q.v.*), but also those dealing with child labor (*q.v.*), and with the enforcement of special educational opportunities for defectives, and in carrying into effect the treatment of delinquents through the juvenile court and probation, it is highly desirable to have an accurate registration of all children. Under present circumstances, it is difficult to enforce adequate education in the case of children who attend private or parochial schools, notwithstanding the perfection of the laws. In Philadelphia such permanent census or registration is in the hands of the attendance officers. For each pupil a card is prepared, and on this all necessary records are kept. It is obvious that such a system of record as this, once made, would involve only a moderate amount of attention to keep it up to date. If the collection of cards for a given district were kept in the school of that area, attendance officers and others could have ready access to them. At the close of each year, amount of school attendance, etc., should be recorded. At present we have little satisfactory evidence as to the cost and administration of such a system, but obviously it is a logical necessity in proportion as society becomes more solicitous that all children in cities and rural areas shall come within the reach of educational machinery.

It has been proposed to adopt the German system of police registration for people living in cities, compelling householders to report all arrivals and departures. While the system has its advocates, the consensus of opinion is that it would be impossible of enforcement under American conditions. But the registration of school children by attendance officers is not impracticable. D. S.

See ATTENDANCE, COMPULSORY; CHILD LABOR.

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CENTENARY FEMALE COLLEGE, CLEVELAND, TENN. — A school for the education of young women, established in 1854. Primary, preparatory, collegiate, business, and fine arts departments are maintained. Classical and scientific courses are given in the college, leading to their appropriate degrees. Candidates may enter the college freshman year after a school course of seven years; otherwise no definite statement of admission requirements is made. There is a faculty of 15 instructors.

CENTRAL BAPTIST COLLEGE, CONWAY, ARK. — A female college founded in 1893 and under the auspices of the Baptist State Convention. Primary, preparatory, and collegiate departments, and a conservatory are maintained. Candidates are admitted on certificates from accredited high schools, and must meet requirements demanding about 10 points of high school work. The faculty consists of 13 instructors.

CENTRAL CITY COLLEGE, MACON, GA. — An institution for the education of negroes, established in 1899 and conducted under the auspices of the Missionary Baptist Convention of Georgia. Elementary, academic, collegiate, theological, and industrial departments are maintained. The majority of the pupils are in the elementary department. Diplomas are given on completion of the higher courses. There are 14 instructors in the institution.

CENTRAL COLLEGE, FAYETTE, MO. — A coeducational institution chartered Mar. 1, 1855. The corporation, styled the Board of Curators, has 24 members; one third of this number is appointed by each of the three conferences in Missouri of the Methodist Episcopal Church, South (the St. Louis, Missouri, and Southwest Missouri Conferences). Though denominational in origin and control, the college announces its purpose to inculcate only a broad, evangelical Christianity. The usual undergraduate courses of four years lead to the bachelor's degrees in arts and science; the degrees of M.A. and M.S. are given for one year's study in residence, with a thesis. Central College is one of the colleges admitted to Class A by the Board of Education of the Methodist Episcopal Church, South (see COLLEGE BOARDS IN EDUCATION, DENOMINATIONAL); the institution is also a member of the Missouri College Union, an organization which aims to exclude from its membership all colleges of the state which have not facilities for doing creditable college work (see COLLEGE ENTRANCE BOARDS). A preparatory school, known as Central Academy, is maintained. Two "correlated schools," Woodson Institute, Richmond, Mo., and Centenary Academy for Girls, Palmyra, Mo., are also styled Central Academy, their work corresponding to that of the preparatory school managed by the college. Phi Sigma Nu has a chapter in the college. The buildings occupy a campus of 25 acres. Grounds, buildings, and equipment were valued (1906) at $197,000; the total annual income was $18,000. The average salary of a professor is $1350. In 1910 there were 99 students in the college and 71 in the academy. There are 13 members on the instructing staff, of whom 10 are full professors. William A. Webb was inaugurated as president at the fiftieth anniversary of the college, Oct. 7, 1907. C. G.

CENTRAL COLLEGE FOR WOMEN, LEXINGTON, MO. — Established to succeed the Marvin Female Institute in 1871; under the auspices of the Methodist Episcopal Church, South. The present title was adopted in 1906. Preparatory, collegiate, musical, and fine arts departments are maintained. About 6 points of high school work admit to the freshman year of the college. Degrees are conferred. There is a faculty of 8 professors and 14 assistants.

CENTRAL COLLEGE, HUNTINGDON, IND. — A coeducational institution chartered in 1897 and under the control of the Church of the United Brethren in Christ. Academic, collegiate, theological, musical, and commercial departments are maintained. The admission requirements are equivalent to about eight points of high school work. Degrees are conferred. The theological course extends over three years, at the end of which the degree of Bachelor of Divinity is granted. There is a faculty of 6 professors and 4 instructors.

CENTRAL NORMAL COLLEGE, DANVILLE, IND. — A coeducational institution organized in 1876, giving preparatory, collegiate, law, normal, and business courses. The collegiate courses are academic, scientific, and classic, and are given in three years. The admission requirements are indefinite. Degrees are conferred. There are 22 instructors on the faculty.

CENTRAL PLAINS COLLEGE AND CONSERVATORY OF MUSIC, PLAINVIEW, TEX. — Founded in 1907 as a coeducational, nonsectarian institution. Elementary, academic, collegiate, commercial, and industrial departments are maintained. The requirements for admission to the college courses which lead to degrees are not definite. There is a faculty of 20 instructors.

CENTRAL UNIVERSITY OF IOWA, PELLA, IA. — Established in 1853 by a resolution of Iowa Baptists as a denominational, coeducational institution. Academic, collegiate, theological, fine arts, normal, and commercial departments are maintained. Candidates are admitted on certificate from accredited high schools or by examination requiring approximately 12 points of high school work. Degrees are conferred in classical, philosophical, and scientific courses. There is a faculty of 12 professors and 7 instructors.

CENTRAL UNIVERSITY OF KENTUCKY, DANVILLE, KY. — Established in 1901 by the union of Centre College, Danville, with the Central University, Louisville. Centre College was incorporated by the legislature of the state in 1819. Though planned chiefly by Presbyterians, the charter forbade the inculcation of religious teachings peculiar to any sect of Christians. In order to relieve the financial distress into which the college soon fell because of insufficient appropriations, the Presbyterian Church offered to secure a sufficient endowment provided that the election of trustees should be entirely in its control; this precipitated a long struggle, which ended in the amendment of the charter, whereby in return for $20,000 the selection of trustees was to be made by the Synod of Kentucky. In 1830 the financial provision was complied with, the Rev. John Clark Young was chosen president, and Centre College began a history of valuable service, interrupted only by the almost complete emptying of its classrooms during the Civil War. The close of the war found two Presbyterian General Assemblies (North and South) in existence, each one of which claimed the ownership of Centre College. The resulting dispute was not decided until the Supreme Court of the United States, in an important opinion known as the Walnut Street Church decision, declared invalid the claim of the Southern Synod based on the allegiance of most of those interested in the college, and continued the legal possession of the northern body. This decision caused the establishment of the Central University. One hundred and fifty thousand dollars were raised, and in 1873 the legislature granted a charter to the corporation, which was styled the Alumni Association of Central University; the institution soon afterward opened its doors at Richmond. The alumni association, which included all the alumni of Centre College graduated previous to the separation and the alumni to be graduated in the future from the Central University itself, was to elect the governing body, the Southern Presbyterian Synod to control the theological school and one of the preparatory schools. In 1884 the charter was so amended that the right of election was conveyed from the alumni association to the Southern Synod, the synod to elect two thirds of the board of curators, however, from the membership of the association.

In 1901 all the parties holding any right to either Centre College or Central University agreed to the amalgamation of both institutions under the name of the Central University of Kentucky. The College of Liberal Arts, which was to continue to be called Centre College, was to remain at Danville. The property at Richmond was to be turned into a good preparatory school of high grade, while the medical and dental schools established at Louisville by the first Central University were to remain as hitherto. The administration of the united university was to be in the hands of a board of 24 trustees, half of whom should be elected by the Presbyterian Synod North and half by the Synod South. Each trustee was to serve 4 years. In 1907 the two synods relinquished all powers of election or of vetoing the election of trustees, the board becoming self-perpetuating; on May 26, 1908, the university was placed on the accepted list of the Carnegie Foundation for the Advancement of Teaching (*q.v.*), as a non-sectarian institution participating in its system of retiring allowances to professors.

Central University maintains Centre College, the classical, scientific, and literary departments, including courses in civil, electrical, and chemical engineering; a graduate department, conferring the M.A. degree; a college of law, suspended early in the history of Central University at Richmond, but reëstablished in 1901 as the successor of the school reorganized in 1898 by the university, and of the Danville Law School established in 1894; and the Louisville College of Dentistry, established in 1887, of which William E. Grant is president. Admission to the Centre College and to the School of Law is by examination or certificate from an accredited or approved four-year high school.

Centre College has the life of a small college of the best type; both before and after the Civil War, it numbered among its alumni an unusual proportion of distinguished men, among them 25 college presidents, 29 representatives in Congress, 5 United States senators, 9 governors of states, two Vice-Presidents of the United States, and many other public officers. Fraternities have been established at Centre College as follows: Beta Theta Pi, Phi Delta Theta, Phi Kappa Sigma, Sigma Chi, and Kappa Alpha, Southern. The fraternities established at Central University include: Sigma Alpha Epsilon, Alpha Tau Omega, Phi Delta Theta, and Delta Kappa Epsilon. The building of the Dental College in Louisville is valued at $115,000; the grounds, buildings, and equipment of Centre College were valued (1906) at $257,000; the total annual income was $32,369. The average salary of a professor is $1600. There are (1909), not including the Dental College, 17 members on the instructing staff in Centre College, of whom 11 are full professors, and 8 members on the instructing staff in the Law School, of whom 4 are full professors. The students number: Centre College, 133; Law School, 32; Dental College, 168; total, 233. Frederick William Hinitt, Ph.D., D.D., is president. C. G.

CENTRAL WESLEYAN COLLEGE, WARRENTON, MO. — A coeducational institution founded in 1864 by the Methodist Episcopal Church. Academic, collegiate, musical, and commercial courses are maintained. Sixteen units are required for entrance into the freshman class. Admission is by examination or on certificate from accredited schools. Degrees are conferred in classical and modern languages, philosophical and scientific courses. There is a faculty of 10 professors and 13 instructors and assistants.

CENTRALIZATION. — This term is employed to designate the tendency in school administration to concentrate authority and to reduce management by laymen. In the early history of America education was a local and popular function, and it is still largely so in the nonurban communities of most states. But in a marked degree since 1860 the tendency has been toward centralized administration. Localized and democratic administration of public education is characterized by the following qualities: the constitution of the state authorizes and establishes it only in most general terms; state legislation is not specific and is largely permissive; schools and school systems are administered and supervised mainly by laymen holding office for short periods and quite responsive to public opinion; the areas of administration for important functions are small, such as districts or wards of cities; town meetings or public elections are competent to decide a variety of administrative questions, such as appropriating money, selecting textbooks, locating schoolhouses, and deciding on new types of education; and state officials have mainly advisory powers, or, at most, certain powers of veto.

Centralized administration, on the other hand, exhibits these characteristics: the state constitution fixes many administrative details, such as types of schools that may be permitted, maximum tax levies that may be imposed, methods to be employed in distributing funds, and qualifications and compensations for certain offices; the state legislature by statute and by its control of municipal government regulates a variety of the details of administration, thus reducing the possibilities of initiative and variation in the local community; administrative functions are transferred from the smaller to the larger areas, as when certification of teachers, selection of textbooks, formation of courses of study, inspection of schools, conduct of institutes, and other administrative functions become the duties of state officials, or when the district, or the part of the city, has to yield its authority to the county or to the consolidated city; popular meetings and elections diminish in number and effectiveness, their powers being conveyed to representative boards; lay boards decrease in size, their members are appointed rather than elected, and the members' terms of office are prolonged, thus removing them from the immediate control of the popular will; under the lay boards appear experts whose functions increase at the expense of the board, whose tenure becomes relatively secure, and who are not necessarily representative of, or informed with regard to, the local opinion and will. Among American states, New York is commonly regarded as having the largest degree of centralized administration, while Massachusetts is taken as a type of a decentralized system. But in New York the prevalence of the district system and the election of nonurban superintendents are features of a relatively decentralized administration; while in Massachusetts the district has been abolished and expert supervision is found over all rural areas. In most American cities centralized administration advances steadily as management becomes more complex and requires more expert service.

The system of control and administration in France has been highly centralized, but a marked decentralizing tendency is at present at work. In Germany imperial influence is slight, but in the states administration is highly centralized and professional, except as regards nonurban inspection or supervision, which is still largely clerical. But in Prussia and other states, the tendency in recent years has been toward bringing into existence or stimulating into activity local agencies which, while exercising very slight final authority, nevertheless become centers of local interest and influence. In Great Britain the modern developments have been steadily away from the excessive local and popular control which formerly existed. But the tenacity of the English for local institutions and democratic control has largely prevented the appearance of the antisocial effects of centralization, and it is probable that Scotland and England possess to-day the best balanced systems of combining local and central control on the one hand, and lay and expert administration on the other, that the world has.

Centralized administration of public education may have, at any given period, some good and some bad effects. Other things remaining equal, it promotes efficiency in the following directions: (*a*) It promotes uniformity over large areas, with the accompanying possibilities of economy. Types of educational effort may be coördinated, official bodies reduced, conflicting jurisdictions adjusted, and the material means of instruction provided on a large scale. (*b*) It permits the collective wisdom of the larger area to control the actions of the smaller, to maintain at least a minimum level of cultural uniformity, and thus to prevent local developments hostile to the best interests of the state. The state may determine the minimum amount of money to be given locally to public education; it may aid weaker localities; it may inspect the results of local educational effort: and it may enforce the establishment of new types of education. In a similar way the county as opposed to the smaller areas, or the city as opposed to its divisions, may enforce conditions of efficiency better than the more minute divisions. (*c*) It makes possible the substitution of carefully planned and coördinated policies for the vagaries and immature schemes of purely local administration with its popular control and inexpert management. A large city, or county, or other area, or the state, in inaugurating new policies, may have specialists planning the work even for years before the first step is taken. Information from various sources may be assembled and experiments conducted, before the promulgation of a new policy. (*d*) Finally, centralized administration makes possible the introduction and development of the expert. Undoubtedly this is its most important contribution to efficiency. In proportion as the primitive art of educational administration becomes complex and is transformed into a field of applied science, the presence of specially qualified experts becomes indispensable. But the development of the expert seems to be possible only in divisions large either in area or population and under conditions of control which are not purely democratic, as democracy was understood in the primitive social life of America. Among the types of expert service already past the experimental stage of development in American education may be mentioned: the architect to plan and supervise the erection of school buildings; the man who is at once physician and educator, to direct the various aspects of physical education, such as medical inspection, and to supervise the hygienic conditions of instruction; the business manager to attend to the financial affairs of the school system; the statistician, who directs the making of school records and reports, and who is able to utilize these so as to derive conclusions suggestive of new administrative procedures; the specialized supervisor of instruction, whether of some division of the educational system, as kindergartens, rural schools, grammar grades so-called, or high school, or of instruction in some type of subject matter, such as music, or manual arts; or, finally, the superintendent, the earliest of the experts to be developed and the man who must yet stand at the head of any system, expressing its most genuine demands and coördinating the various aspects of its activities in the interest, first, of the individual child, and secondly, of the final welfare of the state. Not only have the most successful attempts at centralization thus far made possible the utilization of these experts; they create in turn new fields of leadership, for which we may soon expect able men and women to prepare themselves. American education is rapidly developing the profession of superintendent of schools, an office which has no exact counterpart elsewhere, but which must become indispensable to educational progress. Other types of specialized experts must soon be provided. The development of physical education in the broad sense of that word must give us yet the man who is physician and educator combined; the direction of vocational education will require experts who can devote their lives and a long period of training to this work, and some day we must produce leaders who can strike out plans for moral or social training and superintend their execution. It is in evidence that the finances, the architecture, the selection of textbooks, the education of defectives and delinquents, and the adjustment of children to practical life through employment bureaus will all in turn demand their experts. These are all conditions of true educational efficiency; and their development through and under experts requires an increasingly centralized administration of public education.

On the other hand, certain evils tend to follow in the train of centralized administration of public education. The most conspicuous of these are: (*a*) Lack of adaptability. Communities vary in their characteristics, needs, and ability to support varying forms of public schools. One portion of a city may differ from another, rural areas may differ from urban areas, and districts populated by foreigners may present special needs. Uniform schemes administered by central authorities fail in flexibility, and become mechanical. Until we know much better than we now do the genuine aims of public education, uniform schemes may work marked harm through failure to meet local needs. This evil is not, of course, an inherent one in centralized administration, since expert direction may eventually produce flexibility, if there is intelligent local demand for it; but it is a usual accompaniment. (*b*) Akin to this unwelcome result is the waning of popular interest. Localized and popular administration of education has produced in all sections of America a more intense public interest and activity than has any other form of social action. Some forms of political action may thrive and develop without popular interest; not so public education. The best of school education must blend intimately with home and community interests; the absence or withdrawal of this coöperation chills and mechanizes school agencies. Much of the effectiveness of American education has been realized, in spite of its imperfect administration, largely owing to the popular devotion to its ideals and processes. In the face of centralizing tendencies it is hard to keep alive local interest; for the most genuine reform comes only when the immediate community has enough control of the administrative machinery to make its will felt. (*c*) Equally serious is the effect of centralization in diminishing possibilities for variation and experiment. Spontaneity is the characteristic feature of American education. Not only has the public school itself been indigenous in each state, but to a large extent all the special features of public education have had a local and spontaneous development. Within each state communities have vied with each other, have embarked upon experiments, have developed and fixed variations in new directions. Speaking in biological terms the variability of American education has been enormous, which, considering the conditions, has resulted in much progress. Ultimately society will reach the point where, as now in the case of medicine, it will support conscious experimentation on a large scale in education, but until then we can hardly afford to surrender the opportunities, however crude and wasteful, which exist in a decentralized form of educational administration, especially when the spirit of experimentation and competition still prevails. Lack of variability as in the case of adaptability is not an inherent evil of centralized administration, but a probable tendency in the pre-scientific stages in which public education still exists. (*d*) Finally, we have to note that administrative centralization tends to involve the evils of bureaucracy, and not less when it is in charge of experts with more or less permanent tenure. These experts must inevitably tend toward group solidarity, having kindred sentiments and interests, both in pursuit of social satisfaction and an endeavor to accomplish mutual improvement. The relations of the experts toward the public tend to become official and formal. In time a bureaucracy may be formed with distinctively anti-social tendencies. D. S.

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CEOLFRID. — See Biscop, Benedict.

CEPHALIC INDEX. — See Craniometry.

CEREBELLUM. — See Nervous System.

CEREBRAL HYGIENE. — See Mental Hygiene.

CEREBRUM. — See Nervous System.

CERTIFICATE SYSTEM OF ADMISSION TO COLLEGES. — See Accrediting System.

CERTIFICATES, TEACHERS'. — See Certification of Teachers.

CERTIFICATION OF TEACHERS. — **United States.** — The various systems for the certification of teachers in use in the different states, while varying much in nature and scope, are nevertheless reducible to a few types. The town system of certification of Massachusetts and Connecticut forms the first and the lowest type; the county system of certification, as found in Illinois or North Carolina, forms the second and a higher type; and the state system, as found in Arizona or Alabama, forms the third and the most unified type. Independent certification by cities forms a fourth type. In certain states, as Indiana and Connecticut, the state and local systems exist side by side, the two overlapping, and may be said to constitute a fifth type.

Under the town system of certification the certificating and employing functions are combined in the same body of laymen, who are required by law to satisfy themselves as to the moral character of the applicant and as to his or her ability to teach the common school subjects. When this has been done, by oral or by written examination, a certificate is granted to the applicant, authorizing him or her to teach in the public schools of the town, so long as desired. This form is a survival of the old colonial system of personal examination, and doubtless will be supplanted by a better system before long. The cities have abandoned it, and Connecticut has instituted a state certification system designed ultimately to supplant the local systems.

Under the strict county system of certification, the County Superintendent of Schools, or the County Board of Education, prepares the examination questions, examines the applicants for certificates, and grants certificates to teach to those who pass; but in a number of states having a county system of certification certain modifications of this system are found, usually of a kind that look toward the substitution of a more general system of certification than the strict county system provides. In Indiana, for example, the questions are prepared by the State Board of Education, instead of by the county superintendents, thus securing state uniformity of questions. In Michigan examination papers written in one county may be forwarded to another county to be graded, and for a certificate to teach. In Indiana papers may be forwarded to the state superintendent for grading, and if he approves of the answers, a certificate, valid in any county in the state, will be issued. In California a certificate granted on examination in one county is recognized freely in any other, without further examination. All of these are forces operating to break down the strict county system and to establish in its place a more general and a more liberal system of certification for the teachers of the state.

Other forces tending to break down the strict county system are the establishment of coördinate systems of state examination and state certification, with certificates of higher standing and wider validity; the increase in the educational and professional standards, which has led to the abolition of the lower grades of certificates; the recognition of normal school and university documents, in the place of an examination; and the growing force of public opinion, as the teaching force has come to express itself more forcibly on educational questions, and to object to unnecessary and artificial barriers. The freedom of movement of good teachers ought to be restricted as little as possible. The strict county system inevitably shields the weak by protecting them from the open competition of the strong.

Another force tending slightly to break down the strict county system, but tending in particular to elevate the standard of certificates in the state, is the fact that the cities have been unable to use the low-grade teachers certificated under the county systems, and have been forced, for their own protection, to establish independent certificating systems of their own. The larger the city and the more important the school system, the greater the justification for special examination systems and higher standards to enter the work. The city examinations are of two kinds. In the first the city examination parallels the county or state examination, with perhaps a few more branches added, and frequently certain educational prerequisites are set up for admission to the examination, such as graduation from a high school, or a normal school. In this case the city examination system is a form of local certification, doing the same kind of work as is done by the county or state, and with the same ends in view. The standard is usually higher, and an elevation of standard on the part of the state as a whole would lead in most cases to an abandonment of the local systems and to an acceptance of the county or state certificates. To the second kind of city examination no one is admitted who does not possess a certain grade of county or state certificate, and then the applicants are examined, usually orally as well as by written test, with a view to selecting the most capable and promising for teachers in the city. In this case the city examination is a kind of civil service test of fitness and competency, erected on top of the county or state requirements. Many cities also conduct a series of annual examinations for the teachers belonging to the city system, using the results of these as a basis for making promotions and salary increases.

In the strict state system the state examination has completely superseded the local examination, and the state certificate has taken the place of the local certificate. Most state systems, however, are of a modified type. In the strict state system all questions are made out by a central authority, such as the State Superintendent, or the State Board of Education, or the State Board of Examination, and all papers are graded, and all certificates are issued, by this same central authority. The county superintendents usually act as agents, giving the examinations and forwarding the papers to the central authority for grading. Alabama and Arizona are examples of a completely developed state system, while North Dakota, South Dakota, and Nebraska are examples of a state system in the process of evolution, but not as yet completely developed.

About three fourths of the states of the Union provide some form of a state system of examination and certification for the granting of professional and life certificates to experienced and successful teachers. The local certificating system here continues its local work, the state system confining its work to the granting of higher certificates and diplomas to those who have served a preliminary apprenticeship under the local system. This constitutes the fourth type. The theory underlying this higher certificating system is that of rewarding successful teaching experience and professional effort by a certificate of a distinctly professional character. If the attainment of this higher state certificate is based on further study and evidence of growth, as well as teaching experience, it forms one of the best means of certificating teachers for a state that can be devised; but if the attainment of a higher certificate is contingent only on teaching or keeping school for a certain number of months, then it may become a reward for laziness and incompetency as well as for proficiency. To secure the best results these higher and professional state certificates and diplomas should be led up to by a graded system of certificates, each presupposing added knowledge and professional growth, and the higher certificate or diploma should be granted only after a further examination, professional rather than academic in its nature. Such state credentials should carry interstate recognition, as they should stamp the holder as a person of broad general education, considerable professional success, and high personal character.

In most states a certificate is a certificate qualifying to teach in any school in which the holder can secure employment. Gradually a few states are beginning to erect a new class of certificate for high school work, based in part upon collegiate training, and in a very few states the beginnings have been made for a supervisory certificate, for those who wish to be principals or superintendents. It may be laid down as a safe standard that a teacher is not prepared to teach in a high school who has not had some study beyond the high school or the normal school in an institution where new ways of thinking as well as new subject matter are put before the student. As this standard cannot be secured by an examination on the high school subjects, the only sure way is to require additional study and training for a high school certificate, and to accept credentials and diplomas of graduation in the place of any academic tests. California, with its high school certificate based on college training only, offers a commendable example in this regard. In a similar manner, there is great need of the introduction of a supervisory certificate by which men of training and ability may be singled out from the old successful practitioners. The need is especially strong to-day of men for leadership who have had a good general education, and, in addition, have made a careful study of educational theory and problems. An examination in school law is not enough; a knowledge of administrative theory and practice should be required. The beginnings which Connecticut has made in this direction are commendable.

The great diversity of the requirements for certificates in the different states, and the general unwillingness of the states to recognize equivalents or training, are two of the most marked characteristics of our educational system. A good teacher to-day is unnecessarily hampered in his ability to move about, not only from one state to another, but from county to county, and often from city to city or town to town. Many of these restrictions have no educational significance, but are merely a tariff barrier levied against brains and training from abroad, and in favor of local teachers and home production. The $1 fee so commonly charged teachers for each trial at the examination and commonly used for the institute fund, and the *per diem* paid to the county superintendent or the examiners so long as they keep busy, are serious temptations to these officials to stand in the way of a better and a more intelligent system of certification. Barriers are frequently raised within a state against the training given at the expense of the state. In 14 states it is impossible to enter the teaching profession except by passing an examination. No amount of training in any kind of a school or college serves to make one able to enter the work. The graduates of the normal schools maintained by the state are placed on a par with the "graduates" of the county examination. In about one fourth of the states there is no recognition of certificates from one county to another. Many of these barriers are indefensible, as they only serve to keep out brains and training and to greatly restrict the movements of competent teachers, while the defense of others can be removed by simply raising the professional standards. In 19 states absolutely no recognition is given to any kind of a credential or diploma from any other state.

There is great need of an attempt to evolve some more uniform standards of certification from out of the diversity of requirements now in existence. Certain educational prerequisites should be established, certain common requirements or norms laid down, options or equivalents should be recognized, and certain meaningless subjects now in the examination lists of some states should be eliminated. So far as a candidate can supply evidences of training, certificates obtained, and satisfactory evidence of successful experience, these should be accepted, leaving the candidate to supply only the deficiencies by an examination instead of requiring him to pass on the entire examination list. What has been done in the matter of college entrance requirements should be done in the certification of teachers. Each state must, of course, be allowed to set its own standards, and a state cannot be expected to accept certificates coming from states which represent lower professional standards than its own. This should be recognized and accepted as a matter of course, and reciprocity should not be expected. Instead of striking back by way of retaliation, as certain states do because their low credentials are not accepted in return, they should, on the contrary, welcome the teacher from the state with higher standards than their own. It is possible for every state to evaluate the credentials from other states in terms of its own, if equivalents are accepted and a little flexibility is allowed. If this is done, it is then possible to arrange an accredited list of normal schools in and credentials from other states, which may be accepted by the local certificating authorities in place of an examination. A fundamental principle of action should be that the certification door should always be kept open for competency, from whatever quarter this competency may come.

In the matter of examinations, there is great need of decreasing the emphasis now placed on the written test. As fast as this can be done, the examination ought to be decreased in frequency and in importance as a means of recruiting teachers for the schools of the state, and more ways should be provided to secure the educated and the trained teacher instead of the raw recruit. The plan of Arizona and California, for example, where normal training obtained elsewhere is freely recognized, has done much to help draw to them the best teachers from the eastern states, greatly to the advantage of the schools of Arizona and California. In such matters as the validity of certificates, renewals without examination, abolition of the objectionable fees exacted from teachers for examinations, and inter-county and interstate recognition of certificates, there is considerable room for improvement and reform in nearly all of our states.

See TEACHERS, TRAINING OF; also the special articles on the different state school systems, as ALABAMA, CALIFORNIA, etc., and under the heading *Teachers and Training*, for a statement of conditions and requirements in each of the states.

E. P. C.

England. — The Board of Education will recognize as on the staff of an elementary school certificated, uncertificated, provisionally certificated, and student teachers, with a distinction as to the number of pupils for which each type may be responsible. The Certificate of the Board of Education may be obtained either by direct examination, set by the Board, or by the final examination in a training college; there is in addition a liberal recognition of equivalents. The uncertificated teacher must have passed a term of apprenticeship and the Preliminary Examination for the Elementary School Teachers' Certificate or any of the number of equivalents. Both examinations confer permission to teach for life. The provisional teacher is only recognized up to the twenty-sixth year, and the student teacher only for one year. For employment in secondary schools the Board may insist on a recognized course of training as a qualification where it thinks fit. At present, however, this requirement is not insisted upon, nor is there any certification of teachers for secondary schools by the Board, although the question is still under debate.

Germany. — It is the universal practice in Germany that no person can be permitted to teach who has not passed a state examination. The usual requirements are three (Prussia) to six (Saxony) years' training in a normal school, the passing of a state leaving examination from the normal school, two years' service as a probationer, and the passing of another examination for permanent appointment. For appointment in the secondary schools a candidate must pass a state examination in academic subjects, must spend one year in a training department attached to a high school, and serve another year as a probationer.

France. — Two classes of primary school teachers are recognized — the *Stagiaires* and the *Titulaires*. The former serve as probationers for at least two years and must have passed an examination in the subjects of the highest class of a primary school (*brevet élémentaire*). The latter are regular teachers appointed after passing the examination for the *certificat d'aptitude pédagogique*, for which candidates are eligible after a course at a normal school or the 2 years' service as *stagiaires*. The qualifications of candidates for appointment in secondary schools vary somewhat according to the age of the pupils to be taught, and according as the school is supported by the state (*lycée*) or by the local authority (*collège*). Teachers of purely secondary school subjects must for the lycée have had a course at a university or the higher normal school and must have passed the state examination (*agrégation*), which is competitive and very severe. The qualifications for the college are somewhat lower. Both classes of teachers are, however, state servants.

See the separate articles on the National Systems, and also the article on TRAINING OF TEACHERS.

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CEYLON, EDUCATION IN. — Ceylon, which came under British control in 1815, presents similar social and religious conditions to those of India, but the educational problem of the island is less complicated and difficult because of the smaller area and population. Moreover, since the third century, B.C., when Buddhism was introduced into Ceylon, its influence, which is liberalizing and democratic, has prevailed among the natives. The census of 1891 gave the population of the island as 3,595,954, of whom 60 per cent were Buddhists, 23 per cent Hindus, 10 per cent Christians, and 7 per cent Mohammedans. The Christians numbered 349,239, of whom 287,419, or 82.3 per cent, were Roman Catholics.

Elementary education, so far as it is under state supervision, is carried on by government schools and aided schools. The former are controlled by local authorities under the charge of the Department of Public Instruction, which appoints and pays the teachers, and provides the schools with books, furniture, and apparatus, the funds for this purpose being voted annually to the Department from the general revenue. The construction and care of the buildings and the enforcement of school attendance are duties which fall upon the village committees. Attendance at school is enforced by the prosecution of delinquent parents before the "Village Tribunal," which has the power of inflicting small fines. Aided schools are carried on either by religious bodies or by private individuals. They are inspected and examined by the Department of Public Instruction, which pays them a grant on the results of an annual examination, the funds for this purpose being also voted annually from the general revenue. The managers are responsible for the maintenance and upkeep of buildings, and for all other expenses. Ceylon has long been a field of missionary activity, and nearly all the religious denominations of America and Great Britain maintain schools which have been recognized by the government. There are also many Buddhist schools, which as a rule are under the Buddhist Theosophical Society; a large number of Sivite schools, which are under private management; and a few Mohammedan schools.

According to the range and nature of the instruction given, schools are classified as elementary and secondary, but these terms are very nearly synonymous with vernacular and English. The children attending vernacular schools are a majority, about 85 per cent of the total number under instruction; these schools are free, and provide a good education in Sinhalese or Tamil, in accordance with a syllabus, the range of which corresponds closely with that of English elementary schools as they were a few years ago. In the English schools fees are charged, and these schools provide the higher education of the island. Statistics covering the decade 1875 to 1907 show a steady increase in both government and aided schools. The former class numbered 479 schools in 1898, with 46,279 pupils; in 1907 they numbered 616 schools and 75,589 pupils. The corresponding numbers for the aided schools were in 1898, schools 1220, pupils 103,951; in 1907, schools 1680, pupils 166,234. There were also in 1898, unaided schools 2330, with 34,805 pupils, and in 1907, unaided schools 1758, with 33,699 pupils. Of the total number of government and aided schools in 1907, viz. 2296, the vernacular schools comprised 2051, with an enrollment of 145,639 boys and 60,945 girls; total 206,584, or 85 per cent of the enrollment in the schools of both classes. The number of English schools in 1907 was 195, with an enrollment of 27,948, of whom 22,376 were boys, and 5572 girls. Although these schools offer courses of instruction leading up to the college entrance requirements, the greater part of their work is elementary.

The increasing number and patronage of the English schools are signs of the advance of the population in prosperity and in the ways of modern civilization. Hence special efforts have recently been made by the Department to systematize the higher work of these schools and to reclassify the elementary sections with a view to meeting the different requirements of young children and of older pupils who have passed through the vernacular schools. At the present time, therefore, Ceylon is the field of an interesting experiment in adjusting instruction in a foreign language and in unfamiliar branches to a native people of unusual intelligence and occupying a strategic position in the commercial movement of the world. The statistics pertaining to vernacular and English schools include schools for girls, which are the subjects of special regulations. The English schools have been placed under a special inspector, and the director of public instruction in his latest official report emphasizes the need of a body of trained women teachers for the instruction of girls. In common with the English schools for boys, those for girls prepare students for the Cambridge University local examinations, which are conducted in the island. In 1907 the number of pupils who took the junior examination was 565, of whom 463 were boys and 102 girls. The number who passed was 247 boys (21 with honors) and 57 girls (7 with honors). The number of candidates at the senior examination was 333, viz. 299 boys, 34 girls; the number who passed was 166, boys 146, girls 20; 13 boys and 1 girl secured honors.

Training of Teachers. — The religious denominations have established schools for the training of teachers which are aided by public funds; but the results of the training have been unsatisfactory, and in 1903 a government training college was opened which was intended to set standards for the service. In 1908 the order was issued that after the close of 1909 no one should be admitted to the examination for the second-class teacher's certificate who had not gone through a course of one year at the government training college and passed the first year's examination in the theory and practice of teaching. It was also determined to admit women to the English Department of the school, whereas, at first, they were only admitted to the vernacular class. This action has already been justified by the success of the women students at the examinations, and the consequent increase in the supply of teachers qualified to teach English to the natives.

Special Institutions. — One of the most interesting educational works in the island is that of the Maggona reformatory for boys conducted by the Roman Catholics. All boys remanded to the institution are taught some useful trade which they are able to follow after their discharge. This suggestive example has had much to do with the development of a general movement in favor of industrial training. There are already 37 industrial schools, 10 for boys, 23 for girls, and 4 mixed. The preferred industry for boys is carpentry; for girls lace making. The schools of this class received in 1907 government grants amounting to 51,175 rupees ($16,581). School gardens are rapidly multiplying, above 150 being in operation in 1909. The government encourages the work by special grants.

Special Problems. — As in British India, the education of Mohammedans offers a special problem in Ceylon. Whereas the children at school represent 1 in 13 of the entire population, for the Mohammedans alone the proportion is only 1 in 48. Special measures have been recently adopted to overcome the indifference of this part of the population. The needs of the children of laborers on the large estates have also excited attention, and recent regulations make it the duty of the superintendent of every estate to provide suitable premises for the conduct of a school and order that all plantation schools shall be subject to inspection by a government official.

Higher Education is represented in the island by the technical school and the Royal College at Colombo. The former has admirable equipment for civil and chemical engineering; railway business, physics, a special chemistry course for medical students, stenography and commercial branches. The average enrollment in all departments is about 250 students. In 1908 diplomas were conferred on 23 graduates. The Royal College, which is within the circuit of Madras University, is conducted on the plan of an English college. It has two scholarships available at London University for students who passed the competitive examination, and its course of instruction prepares students for matriculation at London University.

The annual expenditure by Government for education in the island is about 1,300,000 rupees, equivalent to $421,200. A. T. S.

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CHADBOURNE, PAUL ANSEL (1823–1883). — Educator; born at North Berwick, Me., on Oct. 21, 1823, and graduated from Williams College in 1824. For several years he was engaged in teaching in New Jersey and Massachusetts, and later served as professor at Williams and Bowdoin Colleges. For three years he was president of the University of Wisconsin, and in 1872 he succeeded Mark Hopkins as president of Williams College. The last year of his life he was president of the Agricultural College at Amherst. Author of *Relation of the Natural Sciences to the Intellect* (1860) and *Instinct* (1872). He died in New York City on Feb. 23, 1883. W. S. M.

CHALMERS, THOMAS (1780–1847). — A Scottish theologian and philosopher. He was born at Anstruther in Fifeshire, and studied at St. Andrews University, where he distinguished himself in mathematics, political science, and natural history, studies to which he devoted much of his attention even after being licensed to preach in 1799. In 1802 he was appointed assistant professor of mathematics in his university. In 1809 he contributed an article on Christianity to Brewster's *Edinburgh Encyclopœdia.* In 1815 he was elected minister of Tron Church, Glasgow, where he soon established a reputation for brilliant oratory, which he augmented on a visit in 1817 to London. While in Glasgow he interested himself in the moral uplifting of the members of his parish. Moving to St. John's Parish, where he found an itinerant population steeped in vice, he divided in into districts for administrative purposes and established week-day and Sunday schools, which were well attended. He embodied his experience in his book on *Christian and Civic Economy of Large Towns* (1821–1826). In 1823 he became Professor of Moral Philosophy at St. Andrews University, and in 1828 Professor of Theology at Edinburgh University. In 1833 he wrote the book which attracted considerable attention *On the Adaptation of*

External Nature to the Moral and Intellectual Constitution of Man. This work brought him recognition from the Royal Society, the honorary degree of D.C.L. from Oxford, and election as corresponding member of the French Institute. When the schism in the Church of Scotland took place (1843), Chalmers seceded with a large following, and was instrumental in organizing the Free Church. He was appointed Principal of the Free Church College, and died in 1847.

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CHAMPEAUX, WILLIAM OF (*c.* 1070–1121). — A scholastic philosopher who may be credited with laying the foundations of the future University of Paris. He was a pupil of Anselm de Laon. He was the Chancellor or Scholasticus of the Cathedral School, and enjoyed a wide reputation as the greatest exponent of realism (*q.v.*). His fame drew students from all parts of Europe, and contributed to place the schools of Paris above those of Tours, Bec, and Chartres (*qq.v.*). William was, however, rapidly eclipsed by his more brilliant pupil, Abelard (*q.v.*), who took the nominalistic view. The master retired through mortification to the Abbey and School of St. Victor, the stronghold of realism (1113). Soon after this period he became Bishop of Châlons-sur-Marne. William had the reputation of being the first dialectician of France, and was known as the "pillar of doctors."

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CHAMPLIN, JAMES TIFT (1811–1882). — Educator, graduated at Brown in 1834. He was three years instructor at Brown, fourteen years (1841–1857) professor at Waterville (now Colby) College, and fifteen years president of that institution. Author of several Greek textbooks and works on intellectual philosophy, ethics, and political economy. W. S. M.

CHANCE. — See PROBABILITY, THEORY OF.

CHANCELLOR OF UNIVERSITY. — The chief executive officer in English universities. Originally he was the representative of the bishops in educational affairs of the diocese, his chief function being to issue licenses to masters. When the universities arose, the bishops claimed the right of control, and the chancellors continued to act as their representatives. This system of authority on the part of officials who stood outside the universities led to friction, as at Paris. Oxford and Cambridge, however, gained their independence from their bishops at an early date, and obtained the right to elect their own chancellors. The result was to endow the chancellors with the full authority of the universities, and they now became the chief executive officers, with power to grant degrees and to maintain order among the student body and to sanction all university regulations. Until 1588, the chancellors were always ecclesiastics, but at that date the Earl of Leicester was appointed chancellor at Oxford. The chancellors continued to exercise their powers until the Stuart period, when Laud, as Chancellor of Oxford, issued the Caroline Statutes in 1636. Since then the function of the chancellor came to be performed by the resident academic vice-chancellor, nominated by the chancellor and approved by Convocation (*q.v.*). The newer universities adopted the same system as the older. The chancellors are elected by Convocation (*q.v.*) and the vice-chancellors by the Senate. The chancellors hold office for life; the vice-chancellors either for life or for one year, with the right to be reëlected. At present the office of chancellor is largely honorary and is given to men who have gained distinction in political life. All the executive functions are performed by the vice-chancellors, and the presence of the chancellors is only expected on occasions of special importance. In most universities it is the common practice to appoint pro-vice-chancellors to take the place of the vice-chancellor during his absence or illness.

See UNIVERSITIES; also the articles on the leading universities.

CHANCELLOR'S SCHOOLS. — The Chancellor's Schools are the creation of the latter part of the twelfth century. From the time the schoolmaster assumed the title of chancellor he dropped all other teaching and restricted himself to theology, and the chancellor's school and the theological school became convertible terms. We can almost see the change taking place. While in 1183 Master Richard of Stortford signed a deed as Schoolmaster (*Magister Scholarum*) of London, Master Ralph the Theologian, evidently a theological lecturer, signed below him. In 1205 John of Kent (Cantia) signed a deed as chancellor. In 1215 a Lateran Council ordered that every cathedral church should keep, in addition to a grammar school, ordered by several previous councils, a theologician to teach the priests and others the sacred page, and that a prebend should be given him. In 1212 the customs of Lincoln Cathedral were sent for use as a model of the newly established chapter of Moray (Elgin Cathedral), and written down there. They say that the chancellor — the title first appears at Lincoln about 1163 — preside over the school. In 1220–1230 in Bishop

Welles' Register there are several instances of clerics being instituted to churches on condition that they attended the chancellor's school at Lincoln to learn theology. In 1236 the Lincoln customs were written down, and the office of the chancellor is then said to be in the first place to teach the theological school and to preach in the church. At Salisbury, apart from a much suspect deed of 1108, the first appearance of a chancellor under that name is in a deed of 1175–1180. In 1240 we find the bishop on the ground of the thin and scanty fruits of the chancellorship, annexing a rectory to it, on condition that the chancellor cause theological lectures to be given in the city by duly qualified doctors or do so in person, if they so desire. In 1259 Richard of Gravesend, bishop of London, remarking that in other cathedrals in England the lecturer in theology had always been a member of the chapter, but in St. Paul's they had resorted to outsiders, decreed that the chancellor should always perform this duty and that only Masters or Bachelors in theology should be eligible for the office. In 1308, finding the endowment insufficient, his successor, Ralph Baldock, annexed Ealing rectory to the chancellorship with stringent gifts over if the lectures were not given. In 1332 a dean gave a piece of land from the "chapter door as far as the school where the chancellor lectured," to build a cloister, which there had never been before, and a chapter house, which was built over the chancellor's school. At York the dignitary, called in 1189 schoolmaster, in 1191 is for the first time called chancellor and declared to rank third in the cathedral. In 1293 Archbishop Romanus, desiring to increase the students of theology, gave notice to all rectors of churches in his diocese that if they attended the theological lectures of his beloved son the Chancellor of York they should not be disquieted for non-residence. About 1330, Robert of Riplingham, who had been a fellow of Merton College, Oxford, put up a stained glass window in the new nave of York Minster, which contains a picture of him in blue robes teaching in his theological school at York, and by his will in 1332 he bequeathed to his successor as chancellor his chair (*cathedram*) and desk and £300 to provide exhibitions for M.A's. studying theology at Oxford. In 1369 another chancellor of York bequeathed a blue gown to the clerk who attended him in his theology school, and his great Breviary to his successor as chancellor. The bishops' registers in the fourteenth century are full of dispensations for residence to attend schools, and though many of them were expressly for the university and others for grammar schools, the chancellor's schools were certainly included in some cases. These schools were still flourishing, in London at all events, in the second half of the fifteenth century, when Doctor Ive, who had been Headmaster of Winchester College, "kepte the scole at Paulys that ys undyr the chapter-house and there radde many full nobyll lessonings to prove" against certain friars who had been preaching socialism and communism "that Cryste was lord of all and noo beggar." He did it in state "after the forme of scholys," *i.e.* the university, for he had his habit and pelyon (*pileum*, the doctor's round cap) and a verger with a silver rod waiting on him. He kept this school more than two years. At York, however, in 1481 and 1482, complaint was made that the chancellor, who ought to reside and actually lecture and keep school, was non-resident. He was, in fact, also Dean of Hereford. Accumulation of many preferments in the same hands was destroying the cathedral and collegiate churches. At St. Paul's, about 1409, the bishop, Fitzjames, found in a visitation that the chancellor's lectures had for many years been neglected and had practically ceased, and when called on to do his duty the then chancellor pleaded that the deed of 1308 required continuous lectures, and to lecture continually was a condition too grievous and hard to perform — a quaint excuse for not lecturing at all. The bishop therefore made a new statute, defining continuous to mean three days a week, or, if there were only two "legible" days in the week, then two days a week. At the Reformation the chancellors seem to have been left untroubled for the neglect of their schools. Edward VI's Injunctions to the cathedrals rather lessen even their preaching duties; at Lincoln, for instance, limiting them to twelve a year. In Elizabeth's reign, Injunctions issued in 1559 provided that the chancellor should appoint a lecturer to read thrice a week in divinity at 9 A.M. They were still maintained at St. Paul's in 1598, but hardly any one, even of the minor canons or vicars-choral, attended them. The lectures were anyhow no longer in the Chancellor's Schools. The theological schools of the Chancellor, dying in 1480, died in 1547. The universities provided all the theology required. Attempts have quite recently, as at Lincoln and Truro, been made to revive them. But the theological colleges of the present day are Bishops', not Chancellors', Schools. A. F. L.

See Bishops' Schools; Church Schools; etc.

CHANCERY, COURT OF. — The English Court of Chancery has an importance in the history of, and in the administration of, education from the fact that this court (and its modern representative, the Chancery Division of the High Court of Justice) exercises a jurisdiction over trusts, including educational trusts, and possesses, moreover, a certain appellate jurisdiction. In the eighteenth century the dilatory methods of the Court of Chancery had a great deal to do with the inefficiency of the grammar schools of England. The origin of the appellate jurisdiction of the Court of Chancery marks an important stage in the history of English education. By an act of 1597 (39 Eliz. c. 6. *Rep.* 43 Eliz. c. 9. s. 30) Commissioners for Charitable Uses were appointed to inquire into the misemployment of charitable gifts of lands and goods. An Act of 1601 (43 Eliz. c. 4) took the place of this statute, and enacted that, whereas property had been given to (among other objects) schools of learning, free schools, scholars in universities, and the education and preferment of orphans, and that there had been frauds, breaches of trust, and negligence shown by the trustees, for redress and remedy of the same, commissioners be appointed by the Lord Chancellor (and the Chancellor of the Duchy of Lancaster) to inquire into the trusts in the various dioceses and make orders for the execution of the trusts in accordance with the directions of the donors or founders. But the commissioners had no power of inquiry into the endowments of the colleges and Halls at Oxford and Cambridge, or of the colleges of Westminster, Eton, Winchester, or of any cathedral school or of any college or free school which had special visitors or governors or overseers appointed by the founders. The eighth section provided that all decrees of the commissioners should be certified into the Court of Chancery (or the Palatine Court as the case might be), and the Lord Chancellor (or the chancellor of the duchy, as the case might be) should úndertake the enforcement of the decrees. The tenth section gave an appeal to any person aggrieved by a decree to the Lord Chancellor (or the chancellor of the duchy in the case of Lancashire). It was fortunate that the above exceptions were made, for it was found in practice during the eighteenth century that the law expenses, appeals, and delays were ruinous. Some 33 schools were, however, reformed by the commissioners between 1601 and the early years of the nineteenth century. The Act of 1601 was repealed in 1888. But apart altogether from statutes the Court of Chancery (now the Chancery Division of the High Court of Judicature) has an inherent jurisdiction in relation to educational trusts. Apart from the powers of a "Visitor" of a school (as to which see A. H. H. Maclean's *Law of Secondary and Preparatory Schools,* 1909, pp. 109–114), "the court will exercise its jurisdiction to enforce performance and redress breaches of trust on the part of Trustees and Governors even if they are Visitors or the Governors have visitatorial powers." There is no appeal from the exercise of the powers of a Visitor, but the Court will compel him by *mandamus* to exercise his power and exercise it properly. In special circumstances the Court can appoint Visitors under the Grammar Schools Act, 1840 (ss. 15, 16). Under the Charitable Trusts Acts (1853 to 1891) and the Education Act, (1899) and the Orders in Council made thereunder, the Court may be called in to decide questions that arise on the trust by way of appeal from the Board of Education, while the Court, either by consent of the Board of Education or in the ordinary course of the construction of documents, may have to deal with educational trusts. Under the Endowed Schools Act (1869 to 1889) the consent of the Board of Education is necessary before the Court can make an educational scheme. From the point of view of the history of education the cases decided from about 1670 to 1840 by the Court of Chancery on appeal from the commissioners of charitable uses and by virtue of its inherent jurisdiction are all most important. Some of these cases are discussed in *State Intervention in English Education* (Cambridge, 1902, by the present writer), but the whole field is by no means fully surveyed, and until this is done the history of secondary education in England remains in part unwritten. *Eden* v. *Foster* (2 Peere Williams *Reports* pp. 325–326) is a leading case. There is a large and valuable collection of references to education cases decided in Chancery in Mr. Maclean's recent work referred to above. From some of these chancery cases we learn a good deal about the conditions of education in the eighteenth century. In the case of the *King* v. *Archbishop of York* (*Term Reports*, Vol. VI, p. 490), in 1795 Lord Kenyon in giving judgment said: "Whoever will examine the state of the grammar schools in different parts of this kingdom will see to what a lamentable condition most of them are reduced, and would wish that those who have any superintendence or control over them had been as circumspect as the Archbishop of York (Dr. Markham, formerly Headmaster of Westminster School) has been on the present occasion. If other persons had equally done their duty, we should not find, as is now the case, empty walls without scholars, and everything neglected but the receipt of the salaries and emoluments. In some instances that have lately come within my own knowledge, there was not a single scholar in the schools though there were very large endowments to them." This is an instance of the value of these cases. Lord Eldon's judgments in *Attorney-General* v. *Whiteley* (Vesey's *Chancery Reports*, Vol. XI, p. 241) and *Attorney-General* v. *Earl of Mansfield* (Russell's *Reports in Chancery*, Vol. II, p. 501) will be found full of valuable material.

J. E. G. de M.

CHANTER. — See PRECENTOR; also CATHEDRAL SCHOOLS; CHURCH SCHOOLS.

CHANTRY SCHOOLS. — A chantry was an endowment for one or more priests to sing masses and other services for the souls of the dead. In point of fact, except that monks were not necessarily priests, most monasteries, at all events of post-Conquest times, were nothing more than large chantries, being ostensibly founded for the same purpose of commemorating their founders and praying for their good estate when alive and their souls when dead. So too the colleges of Winchester and All Souls, Oxford, which last was particularly to pray for the souls of those who fell in the wars of Henry V with France, have been called large chantries. But the term "chantry" is usually confined to smaller establishments of secular *i.e.* ordinary priests. The earlier chantries, which begin at the end of the twelfth century, and were generally special endowments for single priests attached to larger foundations, such as the great cathedral churches. There were, for instance, 50 chantry priests at St. Paul's Cathedral, 24 at York Minster, where they were incorporated into a separate though subordinate college in 1460, 16 at Southwell Minster, and so on. These had nothing to do with education except that it was usual to supplement the miserable stipends of £2 a year or so which were the ancient and accustomed pay of the grammar or of the song schoolmasters of the great and ancient churches by appointing them also to chantries. (See CATHEDRAL SCHOOLS.) Thus at Southwell Minster in 1504, when St. Cuthbert's chantry fell vacant by the death of William Barthorp, who had for many years been acting master of the grammar school, and one of the canons' vicars by a sort of prescriptive right asked to be presented to it, the chapter asked him to waive his claim in order that they might present to it a fit chaplain who would be able to teach the grammar school. The claim was waived and another man appointed who swore voluntarily on admission to teach the grammar school while he held the chantry.

The fact was that the chantry duties occupied a very small portion of the day, and it was soon discovered that in the interests of the morals of the chantry priests themselves it was desirable to find them other work to do. In the thirteenth century and onwards, when these chantries began to be established all over the country, the priests were largely utilized as what are now called curates, properly speaking assistant curates and incumbents of chapels of ease. They had to assist the parish priest in choir and also in parochial work. Among other ecclesiastical employments that of teaching school was early recognized as one of the most useful to which the chantry priest could be put. It is difficult to say which is the earliest case of these chantry priests being directed by the founder to keep a school. As the foundation statutes are very rarely forthcoming, and the license in mortmain, that is, exemption from the Statute of Mortmain of Edward I, which confiscated lands given to religious corporations to the King, hardly ever mentions anything but the chantry. Probably among the earliest known are those of Crewkerne in Somerset, founded in 1310, Harlow, Essex, in 1324, of Bolton-upon-Dern in Yorkshire in 1328, Whitwell in Rutland in 1345. In 1384, when Lady Berkeley (*q.v.*) founded her chantry school at Wootton-under-Edge in Gloucestershire, we get perhaps the earliest case in which the license in mortmain specifically mentions the chantry used also for a school. A large number of chantries which were also schools are reputed to have been founded in 1390 and the immediately succeeding years, but a great many of these were previously existing foundations, which had then to take out licenses in mortmain in consequence of the inquiry into guilds, which included many chantry priests, ordered after the Peasants' Revolt. It became a not uncommon practice to found in imitation of the collegiate churches a chantry of two priests, one to teach a grammar school and the other a song school. This was done by Langley, Bishop of Durham, at Durham in 1412, at Alnwick by a Percy, William of Alnwick, Bishop of Lincoln, in 1445, at Towcester by Archdeacon Spone in 1449. There does not seem to be any special epoch more distinguished than another for founding these chantry schools. There was a considerable outburst in the latter days of Edward III. Many were founded during the reign of Henry VI, until the Wars of the Roses put a stop to the movement, and it began with renewed vigor as soon as things settled down from about 1475 onwards. The reign of Henry VIII was no more distinguished for the foundation of schools than that of his father or of Henry VI. Only in the latter part of his reign, when dissolution appeared to be impending, were many chantries, not schools by foundation, converted into school foundations. The chantry schools were nearly all from the beginning free schools, which means free from tuition fees, and was always so understood until the theory was started by Dr. Kennedy in 1865 that it meant free from ecclesiastical control, which until 1670 (see CHURCH SCHOOLS and CANON LAW) no school ever was. Some, such as Langley's foundation at Durham, were free only to poor children whose parents asked for it, some were free only for parishioners, but most were free altogether, the priest being required to "teach gratis, without asking anything beyond his stipend for his pains." One singular foundation, that of Gryndour's Chantry at Newland in Gloucestershire, was to "kepe a grammer scoole half-free, that ys, taking of scolers lerning gramer 8d the quarter, and of others lerning to rede, 4d." This was an attempt which has been often made and invariably without success, to combine a secondary school and an elementary school in one. As a rule the song school was the elementary school, and that was why the two were founded in pairs. The chantry grammar schools were intended to do the same work as the great cathedral and collegiate schools, and prepare boys for the universities, as may be most clearly seen from such instances as Wimborne, where the Lady Margaret, mother of Henry VII, directed (*c.* 1497) that it should be in the form and fashion of Winchester and Eton, as did Mr. John Lecue, vicar at Saffron Walden in Essex and Edward Flower, tailor, at Cuckfield in Sussex, quoted in 1503–1528. By the Act which dissolved chantries in 1547 it was stated that their endowments were to be taken from superstitious and devoted to pious uses such as grammar schools. But the chantry schools, about 100 in number, as distinguished from the collegiate church and guild schools, shared the fate of the collegiate church schools (*q.v.*). The song schools disappeared altogether, save at Newark. Three grammar schools, namely, Pocklington in Yorkshire, Berkhampstead in Herts, and Ratcliffes School at Stamford, all hardly founded or claimed not to be properly founded, were at once refounded by Act of Parliament. Some 14 were refounded on a larger scale by Letters Patent of Edward VI with scraps of chantry lands and a few by Letters Patent of Queen Elizabeth and James I. Some subsequently received new endowments from private persons. Those that did not, if they did not perish outright, gradually perished of inanition.

A. F. L.

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CHAPPELL HILL FEMALE COLLEGE, CHAPPELL HILL, TEX. — A school for young ladies established in 1852 under the auspices of the Methodist Episcopal Church, South. Primary and preparatory, collegiate, normal, and fine arts departments are maintained. Admission requirements to the college are about equivalent to graduation from a public school. Diplomas are conferred.

CHARACTER. — That formation of character is the end of education is a commonplace of pedagogical theory, if not of school procedure. Practically the acquisition of various forms of skill and of information in various school subjects are usually the conscious and direct aims of the teacher, and character formation an indirect result. Even discipline, which has apparently a more direct relation to character than have skill and knowledge, is often so hemmed in by peculiar school conditions (an unduly large number of pupils, the lack of material and appliances for constructive work, etc.) as to have only a somewhat remote connection with developing the kind of character most efficient in life beyond the school walls. These discrepancies between the universally acknowledged end of education and the means at hand for realizing it have been the occasion of efforts at educational reforms during all periods. Although their causes are too deep-seated to have yielded completely to the attempts at reform, individual teachers, animated by an adequate consciousness of the nature of character and of the factors of its genetic development, can do much to close the gap between the scholastic means and the moral end.

The elements of character may conveniently be grouped under three heads: (1) discriminating judgment as to relative values, (2) direct emotional susceptibility to values as presented in experience, and (3) force in execution.

1. Judgment is impossible without knowledge, and yet it is so different from knowledge that an individual may possess an extensive amount of the latter and yet be rated low in judgment. Judgment is power to perceive the bearings of what is known. To conceive known facts and laws in terms of what they prognosticate, what they point or lead to, is judgment. Knowledge simply as information is relatively inert and static; it represents learning and the accumulation of memory. Judgment takes what is known with reference to what may come out of it, through action, or as amounting to something, and hence as dynamic. Items of information are connected simply with one another; materials of fact are connected with the consequences in which they issue, and never have a dynamic or motor quality.

Ability to judge implies, moreover, insight, penetration, getting behind the immediate appearance of things so as to see what they *mean*. This insight is known as discernment, discrimination, that is to say, dividing, or parting, matters according to the value of what they stand for, sifting out the significant from the trivial. Judgment is thus opposed to stupidity, or failure to pass from immediate fact to the meaning it indicates, and also to foolishness or failure to discriminate the relative importance of various meanings. Since judgment is a sense of relative values, it is equivalent to valuation, appraisal, estimation on the basis of a principle.

Judgment is obviously the intellectual element in character. It has been the fortune of this element to suffer from both over-appreciation and extreme depreciation. Among the Greeks, knowledge was often identified with virtue or moral excellence. The will was conceived as the intellect in active operation; to know the good was to act in its behalf. That no man does evil voluntarily, but only from ignorance, was almost an axiom with Socrates. And while Aristotle criticized his view on the ground that it ignored the importance of habituation through exercise and also the counteracting force of excessive desire, Aristotle still held that practical judgment or insight is central among the virtues, since the key to all the others. Later development played havoc with this intellectualism. The will was sharply severed, in much medieval speculation, from the intelligence, and was regarded as the only essential factor in character and virtue. The excellence of the will is docility, obedience, subordination to law; its deadliest vice, pride or the rebellious following of its own law. Knowledge was often looked upon with suspicion as fostering a questioning and proud spirit hostile to implicit obedience to moral law and authority. Recently, the emotions rather than the will have been set over against intelligence as the central element in character. The feelings have been held to be the only moving springs to action, and certain feelings — pity or sympathy — have been selected for special moral eulogy. The " heart " has been opposed to the " head " as the source of genuinely moral activity. Yet an impartial survey reveals that " feelings " apart from intelligence lead inevitably to sentimentalism, to blind action and reaction, and to social conditions in which hard-headed men, who know what they want and who have made a study of how to get it, easily manipulate other persons to their own profit.

In many respects, the present day is witnessing a return from arbitrary will and blind emotionality to the Greek principle of intelligence, though with a change in the conception of intelligence. It was natural for the Greeks to conceive of a close relation between knowledge and conduct because they were acquainted with so little secondhand and bookish knowledge. They unconsciously included in their notion of knowledge what we shall call appreciation, a realizing sense of the object. Facts and ideas acquired from another person, no matter how certain, were only opinion, not knowledge. Abstract conceptions did not constitute knowledge till they were matters of direct intuition or insight. Now the whole tendency of modern psychology and logic is to institute a distinction between two types of knowledge, one of which is simply symbolic, while the other is direct. There are many things which we know about through communication by others in language symbols, or which we know by elaboration of symbols — such as mathematics and abstract conceptions in general. The influence of such knowledge upon character is very remote and superficial, except as technical or professional skill is an important factor in character. The other type of knowledge consists of direct insight (or discernment), and intimate acquaintance, method of information *about* things, or ability to manipulate symbols that represent them. Possession of this sort of knowledge always expresses some modification of character, and is expressed in behavior.

Wherever intimate acquaintance exists, we know things not simply in their abstract and impersonal relations to one another, but in their connections with ourselves and their bearings on our achievement and well-being. We know them in terms of our own proper adjustments and responses to them. In abstract or symbolic knowledge all facts are of equal importance or value; perception of their relation to ourselves as agents and to their consequences with respect to our success and failure, to our efforts and accomplishments, confer upon objects a scale of relative values. So far as knowledge takes this form of genuine, deep, and intimate sense of values, action follows insight, for this sort of insight is obtainable only through constant activity in the way of adjustment, response, experimentation, and trial. (See JUDGMENT and KNOWLEDGE.) The problem of intellectual instruction in reference to character is to lay a deep and firmly united foundation of knowledge of this intimate and active sort, and to establish as many lines of association as possible between it and the abstract and symbolic information that is acquired. (See COURSE OF STUDY.) So far as this result is secured, teachers are quite justified in holding that they are engaged in character building " all the time," irrespective of direct moral teachings.

2. The discussion of knowledge makes it clear that the distinction between knowledge and emotion is somewhat arbitrary, or at least that it marks only a distinction, not a separation. Not even the more abstract and purely logical knowledge is without its emotional accompaniment, or an immediate reaction of inclination and disinclination. Its development in any individual depends upon the liveliness and persistence of the emotion of curiosity, love of following matters up to see how they come out, and delight in inquiring for its own sake — what is usually termed love of truth for its own sake. Our intimate acquaintance with things is even more indissolubly welded with our life of affections and aversions. Attention and interest are either two phases of the same process, or else always accompany each other. The vivacity of instinct and impulse in the child, the newness of things and persons, the absence of the dulling of emotion that arises through long familiarity and drilling, cause the nature of the emotional life to be a much more important consideration with respect to building up the child's judgments and ideas than is the case with the adult. What was said about the Greek identification of knowledge with a " realizing sense " of a thing is borne out by the fact that their educational practice and theory laid chief stress upon direct emotional susceptibility to values presented in experience. To lead the young to take pleasure in — to love — the things that are worthy, and to feel pain in — to hate and fear — the things that are unworthy, was considered by both Plato and Aristotle to be the end of education. This reference to the Greeks also indicates the connection of the æsthetic factor — in its broad sense — with direct sensitiveness to differences of worth. While Plato and Aristotle insisted upon early habituation and practice preceding conscious reason with reference to distinctions of good and bad, habituation was never understood to mean purely external modes of action, or routine, formed by repeti-

tion, but an exercise of the affections upon appropriate objects so as to form strong and abiding emotional associations. Rhythm in action and in music, melody of song, decorum and grace in posture and gesture, order and proportion in visual objects, — in short, æsthetic qualities, — were the chief instruments, the end being to create a direct feeling of the beauty of good and the ugliness and disgrace of evil. Hence the wide scope of "music" in Greek education. On the same grounds, Plato stands almost alone, till the eighteenth century, in his recognition of the fundamental importance of the very early years of life, before technical skill and conscious reasoning are possible. The earliest years are those in which the emotions are most intensely active, and when, being as yet unattached to any particular objects, they may be firmly associated with objects so that later in life some objects will always be attractive and others always repulsive. The monastic and ascetic factors in the Christian Church, together with the lack of artistic capacity and opportunity among the northern barbarians, gradually eliminated the æsthetic factor (save in ecclesiastical music) from education. At the Renaissance, it was reintroduced, but rather as a work of the culture of a gentleman than as a moral force. Puritanism and the utilitarian spirit of modern industry have tended to minimize the culture of direct sensitiveness to distinctions of worth in English and American education; and perhaps the greatest deficiency in our educational systems with respect to character building is found in their comparative failure to recognize the fundamental importance of an acute and sensitive direct response, independent of conscious reflection, of the affections to distinctions of worth in arts and objects.

3. Force, patience, and persistency in execution are also indispensable factors in character. When it is said of a person, without qualification, that "he has character," independence, initiative, and energy in pursuit of ends are almost always signified. In Greek education at its best, "gymnastic" was not employed chiefly for athletic results, nor even for health alone, but as a training of executive efficiency. The centuries in which the body was held in contempt were also centuries in which the contemplative life was ranked higher than the active, and an educational tradition was built up opposed to manual and constructive activities in education. They formed no part of the scheme of "liberal arts" which were the true concern of education, but only of the base mechanical arts which were learned in the course of routine apprenticeship. When productive activity was encouraged at all in the regular system of education, it was in elementary schools supported by charity for the benefit of the poor. When, as frequently happened, these schools were taken over by the state or local community, the invidious stigma of "charity" attached to manual activity, so that the subjects of woodwork, etc., for the boys and cooking and sewing for the girls were usually eliminated from schools supported by public taxation.

Various reasons have conspired to effect in the last generation a juster estimate of the moral value of practical activity. The successful use of various games, plays, and forms of manual activity in the Froebelian kindergarten naturally occasioned a feeling in favor of the introduction of similar methods and materials in the elementary school. Growth of knowledge of hygiene and physiology has tended to restore the body to its proper place as an indispensable instrument of right action. Purely utilitarian and commercial demands have pressed the claims of practical efficiency as distinct from mere scholarship. Psychology and biology have revealed the basic importance of instincts and impulses, the active side of our nature, in one whole mental and moral life. While perhaps the narrower utilitarian motive has often been too conspicuous, at the expense of value in character training, as a motive for the reintroduction of active and constructive work into the schools, still the net effect of the convergence of the different factors mentioned has been to create a growing recognition of the moral onesidedness of any educational scheme which appeals simply to the absorption of information and its more or less passive reproduction, instead of cultivating a love of active doing and effective executive capacity. The social aspect of this phase of character training is exhibited in the demand that education shall prepare students for an intelligent choice of a calling in which they may be most serviceable to the community. It is not to be inferred from the above that the mere introduction of physical activity, manual training, etc., will work automatically for the development of force of character. These subjects may of course be reduced to a mechanical or routine place about as easily as any subjects of the curriculum. But these subjects furnish opportunities and tools for a development of the initiative and executive side of our nature which mere bookish objects cannot afford, and therefore, with wise treatment, are indispensable factors in the formation of a character which is not satisfied with being simply a spectator, or passive absorber, but that strives earnestly to put right intention and good desire into actual and concrete effect.

The analysis of character into aspects of wise judgment, sensitive emotional responsiveness, and force in action reveals how largely character forming must be indirect, slow, gradual, and unconscious. The part that can be played in forming character by direct moral precept, by learning of moral rules and principles from others or from books, is comparatively slight, because the isolation of such precepts and lessons from the general flow of experience (the very fact that they are taught only on special occasions as special lessons), is unfavorable to their being deeply knit into the body of active tendencies, affections, and ideas that form the substance of character. There is, then, no reason for denying that educational methods and materials which, on their face, have little to do with securing moral results, may nevertheless be so treated that character formation is their more abiding and significant end, albeit largely an unconscious and indirect end. J. D.

See COURSE OF STUDY, THEORY OF; CULTURE; FORMAL DISCIPLINE; MORAL INSTRUCTION.

CHARACTEROLOGY. — Scientific study of character according to the established rubrics of psychology is more a program than an available reality. The problems which it proposes relate to the underlying basal traits of human nature and the manner of modification, indeed, of transformation of these by the cumulative and diverse influences of civilization. Accompanying the primary characteristics, which, while present in all normal individuals, yet make possible a considerable variation in degree and manner of their effectiveness, is a great array of secondary and more remotely derivative traits, which in turn in the variety of their blends and combinations compose the complex sorts and conditions of men. The principle is justified that such secondary and tertiary traits have intimate relations to the more simple elements of character, and present more refined and indirect as well as more complex modes of their expression. This relation appears nowhere more strikingly than in the varied ramifications of the distinctive traits of the sexes whose differentia of an elusive yet real mental type are traceable " to a third and a fourth generation " from their parent origin in the physical and psychological attractions aroused by the reproductive instincts.

The formulation of the primitively human traits is thus a biological problem, such traits finding their justification in their service for survival and supremacy, and in turn subject to the laws of heredity, while equally adaptable to the needs of the shifting environment. The inherited dispositions must be reducible to a limited group of directly efficient qualities, which in turn are capable of large varieties of expression. Such are the traits of self-assertion, the sex promptings and displays, the social or simply gregarious instincts, the emotional sympathies, muscular energizing, creative or inventive resourcefulness. Combined with this objective exposition is the attempt to trace such differences of expression back to some types of nervous disposition; and this again with recognition of the blends or combinations of such traits which is comprehended in the word "temperament." Historically the types have been recognized as the *sanguine*, *choleric*, *melancholic*, and *phlegmatic;* but this classification is interesting mainly as a curious intrusion of crude anatomical distinction into the psychological field. The chief distinction involved, that of the active, interested, alert, passionate, and fitful, contrasted with the sober, staid, even dull, steady, unemotional, is a real one; and the former must be recognized in all classifications, being more commonly referred to as the nervous type of temperament. Other and more minute classifications have been proposed, but are in the main but variants and derivatives of the distinction between *active* and *sensitive;* while quite a number of the systems recognize a threefold division according to the dominance of *feeling*, *intellect*, or *will* in the make-up. Thus, great men are classified as men of feeling (poets, musicians, etc.), men of intellect (philosophers, men of science), or men of action (soldiers, men of affairs, organizers). Very significant are the attempts to base fundamental distinctions of character upon their morbid exaggerations in disease. The melancholic temperament of the older writers is substantially such a recognition. The hysterical temperament as a type, which in pronounced hysteria exhibits its abnormal manifestations, suggests a most distinctive and adequate variety of character; while other varieties, though less distinct, are yet related to their exaggerated and morbid counterparts.

A prominent problem in the study of character is that of correlation; the determination, so far as may be reached, of the groups of traits that readily combine in close correlation, and through such correlation establish the naturalness of the type; while yet within the type the variety of the degrees of possession of the constituent qualities leaves room for the more detailed subspecies. Thus within the musical group, the question arises as to the correlation of powers of criticism with those of execution, and of these in turn with original composition. This trio of appreciation (with analysis), execution, and invention may be carried over to the pictorial artist or the literary or other group; while the correlation of the artistic qualities with the scientific is usually regarded as slight or negative. Here, however, as in other fields, it is a program of questions rather than a series of conclusions that is available.

Psychology has recognized the problem of character in yet another field, that of "individual psychology," which in turn has given rise to a psychology of social and national and racial groups. Description rather than systematic analysis has been the chief method; and suggestive formulas have been proposed. Individual psychology has for its aim the determination of the superiorities and deficiencies of each person. It attempts this partly upon the basis of specially devised tests, utilizes the methods of correlation, and corroborates its principles by studying the achievements as correlated with the qualities analyzed. The group study has been applied to the artist class, to men of science, to men of genius in general, and again to the determination of national traits. The difficulty of separating natural from acquired quality is inevitable; it is but a phase of the conflict of nature and nurture, the difficulty of determining what men are independently of what they do.

The practical interest in character, and its relation to the delineation of talent and prediction of success, has given rise to a great variety of systems, such as palmistry, phrenology (*q.v.*), physiognomy, graphology, all of which attempt to read character in outward signs. The confusion and arbitrary classifications and principles thus resulting form the best proof of the need for a thorough reconstruction upon an accepted scientific basis. The educational interest in the training of character and the literary interest in its delineation and analysis, support and contribute to the psychological analyses and form one of the most permanently engaging objects of human study. J. J.

See Character; Moral Education; Religious Education.

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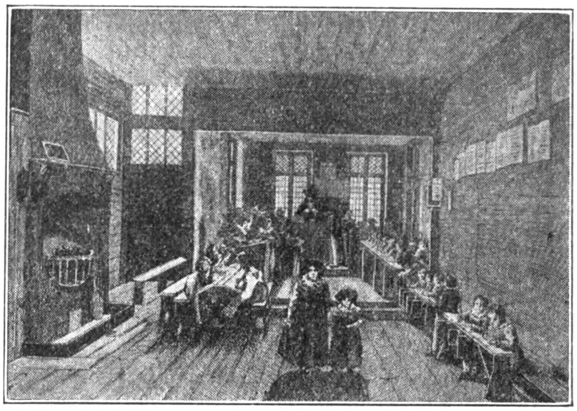
CHARITABLE TRUSTS FOR EDUCATION. — Though we find much earlier than the fifteenth century something that may be called educational trusts, yet that century was the period when the trusts developed into a universal institution and charitable trusts of lands and moneys became common. Earlier foundations were scarcely trusts in the sense that was used from the fifteenth century onward. A grant of land or of a church (as in the case of the Church of Odiham for the schoolmaster of Sarum by King Stephen in 1139) was made for an educational purpose, and that purpose was fulfilled without any legal question. One of the earliest trusts of the recognized type was the foundation by Katherine Lady Berkeley (*q.v.*) in 1384 (8 Ric. II), under license of letters patent, of the Wootton-under-Edge Free Grammar School. After this date charitable educational trusts multiply rapidly. Noticeable examples are the Grimstone Free School in Norfolk founded by deed in 1394; the Higham Ferrers School in Northamptonshire founded by Archbishop Chicheley in 1422; the Sevenoaks Free Grammar School founded under the will of Sir W. Sennocke in 1432 (this school seems to have been incorporated by letters patent of July 1, 1560 [2 Eliz.]; see Certiorari Roll, Bundle 8, No. 67 [unprinted] Rolls office; and regulated by statute 39 Eliz.); Kingston-upon-Hull School founded by J. Alcock, Bishop of Ely in 1486; Stockport Free Grammar School (Cheshire) founded by the will of Sir E. Shaa in 1487 (for will see Lysons' *Magna Britannia*, pp. 780–781); the Chipping Campden Free Grammar School founded by deed of J. Verby, *c.* 1487 (see Rudder's *Gloucestershire*, p. 324); Burton's school at Loughborough (Leicestershire) founded by deed in 1495; Crewkerne Free Grammar School (Somerset) founded by John de Combe in 1499; Prestbury School (Cheshire) founded by the will of Sir J. Perceval in 1502; Cromer Free School (Norfolk) founded by the will of Sir B. Read in 1505; Milton Abbas School (Dorset) founded by the deed of the Abbot (with the consent of the Convent) of Milton in 1520; Saffron Walden Free Grammar School (Essex) by the deed of Dame J. Bradbury in 1525. Many other instances of pre-Reformation free grammar schools of non-ecclesiastical origin created by way of charitable trust can no doubt be cited. The educational losses of the Reformation were in some measure made up by the acceleration of this Charitable Trust movement. The need for the multiplication of grammar schools was generally recognized, and the well-known Sir Thomas Smith on becoming Secretary of State in 1548 introduced on Jan. 23, 1548, into the Commons a "Bill for making of schools and giving lands thereto," which was at once read the first time, and the second time on Jan. 31, and on Feb. 9, 1548, was read a third time and passed. It did not, however, become law. But nevertheless, in Elizabeth's reign, 108 grammar schools were founded and 27 were additionally endowed, while 40 nonclassical schools were founded and 7 additionally endowed, making in all 182 schools (see *Digest of Schools and Charities for Education* presented to Parliament in 1842, and see Mulcaster's *Positions*, p. 327). As to charitable trusts for education in the seventeenth and eighteenth centuries, see de Montmorency's *State Intervention in English Education*, pp. 243–247, and the above Digest. As to Elizabethan and later legislation for the enforcement of educational trusts, see article on Court of Chancery in Education; for the extent of such foundations see also Charity Schools. For the American experience see Colleges, American; the special articles on the older colleges and universities, and PHILANTHROPY, EDUCATIONAL. J. E. G. DE M.

CHARITY, EDUCATIONAL ASPECTS OF MODERN. — See PHILANTHROPY, EDUCATIONAL ASPECTS OF MODERN.

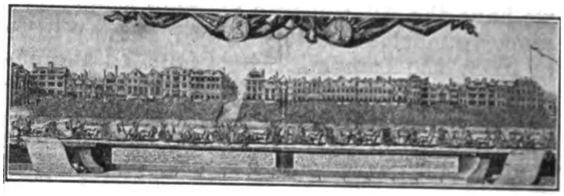
CHARITY SCHOOL. — In its narrower sense a term applied to a particular type of school which sprang up in England during the latter half of the seventeenth century and flourished throughout the eighteenth century. Such a school was open free to the children of the poor, and usually attended only by such; was supported ordinarily by private contribution; and most frequently was controlled by some ecclesiastical or religious body. The institution itself was common in America and on the Continent during the same period, but the term was not so frequently used.

It would be difficult to exaggerate the importance for England of the history of the educational movement which is always connected with the name of the charity schools, for this movement, in association with the school endowment movement that took place between 1670 and 1730, and the Sunday school movement (*q.v.*), which began soon after 1750, laid the foundations upon which was reared during the nineteenth century the English system of elementary education. It is not easy to indicate the exact origin of the charity school movement. Upon this question opinions differ. It is probable that the establishment of the charity schools that rapidly covered England in the early years of the eighteenth century was only one manifestation of a wider movement which not only includes the school endowment movement of 1670–1730, and extends back to include Griffith Jones' Circulating Schools, but stretches back to certain movements in the mid-sixteenth century and forward to the monitorial schools in the early nineteenth century. The medieval system of elementary education, though not absolutely destroyed by the Reformation, received shock after shock from the forces that the Reformation set in motion. The destruction of the chantry elementary schools (*q.v.*) in 1548 swept away a great educational instrument, and though the fundamental idea of *parochial* education survived the Reformation and survives to this day, yet the organized practice of parochial teaching decayed. It was necessary from the middle of the sixteenth century to restore the parochial ideal and the parochial schools. Much was done, but the conformity legislation and the system of episcopal licenses for teachers made it increasingly difficult, as time went on, to find sufficient teachers of sound churchmanship, and this difficulty became insuperable when the conformity legislation of 1662 and 1665 instituted an inquisition into the opinions of teachers at a time when the aftermath of the Great Revolution of 1649 made it impossible for thousands of earnest teachers to accept the tenets of the established church. Hence we might expect to find, as we do find, successive efforts, parochial in their results, but often extra-parochial in their origin, to create an elementary system of education which should be, at any rate, not less efficient for its time and generation than the elementary system which during the Middle Ages in face of numberless disadvantages did such admirable work in the matter both of character forming and of preparing a percentage of children for higher education. But these successive efforts were continually checked by political, religious, social, and economic hindrances. In the second half of the sixteenth century substantial results were achieved, but these were largely neutralized by the political and religious unrest of England from (say) 1625 to 1660. The conformity legislation of 1662–1665 gave a definite check to all forms of education, and the tremendous efforts of the century that followed, shown in the founding of charity schools, endowed elementary schools and Sunday schools, were unable to overcome the *vis inertiae* of a state policy which had denuded the universities and cut off the supply of trained teachers. There was little or no trained teaching in the eighteenth century in England, and when the great monitorial school revival under Bell and Lancaster came at the very end of the century there were no teachers available, while the new industrial movement with its vast aggregations of population had created social and economic obstacles to progress which have only been quite recently overcome. Thus there was one long, organic, wavelike movement from about 1570 to 1870, a succession of impulses which represent the relationship of the Renaissance to elementary education.



Charity school, Bunyan Meeting House, London.

The exact place of the charity schools in this long movement must be described. The barbarism of Wales seems to have been the object lesson which drew men's attention to needs nearer home. When that most learned man, William Salesbury, in 1550 translated into Welsh the Gospels and Epistles as used in the Book of Common Prayer, he gave a new impetus to the old movement which led to the translation into Welsh under the patronage of Parliament (5 Eliz., *c.* 28) of the New Testament. The evangelization of Wales drew men's minds to the same need in England, and it must be remembered that this whole movement was essentially religious. A complete Welsh Bible was issued from London in 1588 and " a portably-sized Bible " was, in 1630, " printed at the expense of one or more citizens of London." The spiritual needs of Wales were very close to the heart of London, and not very long after the time of the Welsh Bible of 1630, Vavasor Powell began active evangelizing work in Wales. This was followed by the Commonwealth Act of 1649, which appointed Church and School Commissioners for Wales to grant (among other duties) certificates to schoolmasters in order that " fit persons of approved piety and learning may have encouragement to employ themselves in the education of children in piety and good literature"; and lastly we reach the stage in which the evangelization of Wales finally reacts on London and England and creates the impulse which produces the charity schools. This last stage was due to the efforts of Thomas Gouge (*q.v.*), a clergyman of the Established Church, who, having been ejected from his London living under the Act of Uniformity on St. Bartholomew's Day, 1662, eventually took up in 1672 the Welsh social and educational work, which still attracted the attention of philanthropic Londoners. Gouge in taking up this work was following up the ideas of Joseph Alleine (1636–1668), another nonconforming clergyman of fame. On Gouge's " first journey into the borders of South Wales he inquired in each town how many were willing that their children should learn to read and write English, and to repeat the catechism. He engaged teachers for both sexes, paying them at the rate of 1*d.* or 2*d.* a week per scholar " (see *Dict. of Nat. Biog.*). Strype's edition in 1720, of Stow's *Survey of London*, must now be quoted. Writing on the charity schools in his time, he says: " This favour of the Londoners towards poor children began divers years ago, in North and South Wales. When, about the year 1670, the Poverty and Ignorance of those Parts raised a compassion in the Hearts of many good citizens, which must be recorded to their Honor: so that they and their Interest contributed such sums of Money, as maintained a great number of poor Welch Children at School, to read English, write, and cast Accompts; and Schools for that Purpose were erected and settled in many Places in those Countries; and this pious Practice so flourished that in the year 1674, or 1675, Certificate was made that, in eighty-six of the chief Towns and Parishes in Wales, 1162 poor children were put to School, over and above 200 put to School the last year by the Charity of others. And this Charity had already provoked divers landlords and Inhabitants of several Towns and Parishes in Wales to put 863 of the poorest Welch Children to School, upon their own Accounts; so that 2225, in all, were already put to school to learn, as before." The movement did not end with education. Gouge desired to furnish the rest of the Welsh people " with Christian Knowledge." Gouge started the distribution of religious books, and for this purpose a famous Trust was formed in London consisting of Churchmen and nonconformists: Tillotson, Whichcot, Simon Ford, Bates, Owtram, Patrick, Stillingfleet, and Fowler were the Churchmen; Durham, Meriton, Hezekiah Burton, Richard Baxter, Matthew Poole, and Gouge were the nonconformists. Various citizens of London, Thomas Firmin, Henry Norton, John DuBois, and others also joined. The committee did excellent work, but after Gouge's death in 1681 the results declined.



Children of the Charity Schools viewing a Royal Procession; London, 1713.

Now the point that is in doubt and which must be considered is whether these charity schools were directly connected with Gouge, his school movement, and the Trust of 1674. It is necessary to consider briefly the history of elementary education between this date and the date of the formation of the Society for Promoting Children's Knowledge (*q.v.*) which was founded by Dr. Bray (*q.v.*) in 1698, and admittedly controlled in a very large measure the charity schools from about that time. In 1674 Baxter and Tillotson, both signatories to the Trust, drew up a " Healing Bill " for a union between conformists and nonconformists and allowing dissenters in certain cases to be schoolmasters. The proposal fell through in April, as the Bishops would not concur. Almost at this very date the Report of the Trust was issued, and certainly Gouge and Tillotson remained on intimate terms, as in 1681 Tillotson preached Gouge's funeral sermon in " a strain of fervid eulogy." The Trust continued after Gouge's death, for we know that the distribution of Welsh Bibles, one of the objects of the Trust, continued. There is no real reason to suppose that the Welsh schools, which contained 1850 children in 1675, suddenly ceased to exist in 1681 on Gouge's death; especially as they were in part supported by Welsh voluntary subscriptions. The writer on

Gouge in the *Dictionary of National Biography* thinks that they ceased at his death; but this is incredible, though they probably soon ceased to bear his name. Now Strype's account of the origin of charity schools, given above, says that these schools began in isolated efforts in particular parishes of London. This was undoubtedly the case. Fortunately something is known of these early schools (see Strype's *Stow* and Maitland's *History of London,* 1756, Vol. 2, pp. 1274–1278). The elementary school movement was active in London before Gouge's time and during the period that so much interest was being taken in Wales. But the earliest elementary schools were endowed schools and not subscription schools. Thus we have the All Hallow's Staining elementary school founded and endowed by William Winter in 1658; the Lambeth School founded and endowed by Richard Lawrence in 1661; the Parker's Lane School near Drury Lane founded and endowed in 1663 by William Skelton; the Bunhill Fields School, Cripplegate, founded and endowed by Throgmorton Trotman in 1673 through the Haberdashers Company; the Almonry School and the Tothill Fields School, both in Westminster, founded by Emery Hill in 1677; the school in the churchyard of St. Saviour's, Southwark, founded by Dorothy Applebee in 1681. We get two schools of peculiar interest in 1685 and 1687. "A crafty Jesuit, who in the year 1685 erected a Free School in the suburbs of London," aroused the efforts of Dr. Thomas Tenison (then Vicar of St. Martin's in the Fields and in later years Archbishop of Canterbury), who erected a Free School in Castle Street "for the educating of divers poor boys of his parish, in opposition to that of the Jesuit." The Archbishop subsequently (1697) endowed this school with £1000 of his own money, and later with £500 which had been left to him and Dr. Patrick for charitable uses. In 1687 one Poulter, a Papist, started a school in Southwark, and thereupon certain members of a Presbyterian congregation, taking advantage (as in the former case) of the liberty allowed by King James II to Dissenters as well as Catholics, built a chapel (in which Bunyan preached) with a school under it known to history as the Zoar Street Gravel Lane Charity School. The first pastor and master was John Chester. This was the first nonconformist school that was openly held.

This incomplete list of schools, which were, in effect, though not in name (except the last), charity schools, must be concluded by three mentioned by Strype, the St. Margaret Westminster Boys Bluecoat School founded in 1688, the Norton Falgate Charity School founded in 1691, and St. James' Westminster, founded in 1697. These schools existed before the foundation of the S.P.C.K., and most of them come within Gouge's period of activity, though they were not connected with Gouge. They prove that there was in London as well as in Wales during the period of the activity of the Trust an active elementary school movement. It was the year after the St. James' School was founded (1698) when the never-to-be-forgotten Dr. Bray in his "plan for the constitution of a protestant congregation for propagating Christian knowledge" proposed that the members of the congregation should "proceed to set up catechetical schools for the education of poor children in reading, writing, and more especially in the principles of the Christian religion." This proposal undoubtedly stimulated a movement which Londoners already had at heart, a movement that had been extended to remote Wales by Gouge. From 1698 the charity schools in London rapidly multiplied. In that year were founded the two schools of St. Anne Westminster, of St. Botolph (Aldgate Within), St. Giles (Cripplegate Without) in Redcross Street, St. Margaret Westminster (Greycoat School), and St. Stephen Walbrook. In 1699 were founded the schools of St. Andrew Holborn, St. Martin in the Fields, St. Paul Shadwell. In 1700 we get additional schools in St. Andrew Holborn, St. Alfege Greenwich, St. James Clerkenwell, St. Sepulchre Within. So the number grew year by year, and not only in London, but through the country. The following table supplied by Strype marks the growth from 1708 to 1718:—

Years	No. of Schools London	No. of Boys	No. of Girls	Boy Apprentices	Girl Apprentices	No. of Schools in the Country	Boys in the Country Schools	Girls in the Country Schools	Total of Charity Children in London and Country
1708	74	1944	1064	896	351	274	4,707	549	8,264
1709	80	2181	1221	963	405	310	4,817	763	8,972
1710	100	2480	1331	1018	437	398	6,224	920	10,955
1711	112	2799	1490	1096	467	521	7,883	1457	13,629
1712	119	3047	1640	1385	652	638	9,037	1832	16,156
1713	114	3056	1696	1529	721	909	13,421	2552	20,725
1714	117	3077	1741	1650	824	992	14,775	2770	22,363
1715	120	3044	1783	2179	896	1073	16,529	2924	24,931
1716	124	3107	1789	2577	990	1115	17,114	2921	24,931
1717	124	3111	1812	2791	1124	1157	18,960	3169	27,052
1718	127	3213	1896	3253	1330	1231	19,889	3612	28,610

But we have to note that it was not until 1704 that the charity school system had really secured a grip upon the country. In 1704 there were 54 charity schools in London, and 35 in the country. Strype, writing in 1720 with respect to the year 1704, tells us that "all these (London) schools were set up within the space of eight or nine years last past, except one or two, which were set up three or four years before; whereof one was that in *Norton Falgate* (1691) and another that in *St. Margaret's Westminster* (1688)." Thus it is clear that Strype bears witness to the position adopted above, that the charity school movement began some years before Bray took up education. It has already been mentioned that in 1685 a Jesuit set up a school in or about Castle Street and that in 1687 another Papist (Poulter) set up a school in Southwark. These schools respectively awakened the educational energy of the Church and of the nonconformists, and Dr. Tenison's Castle Street School of 1685 and the Presbyterian Zoar Street School were really the formal beginning of charity subscription schools. In 1756 the 128 charity schools of London included 5 Presbyterian schools, 3 independent schools, 1 Quaker school, 2 French schools, and 1 school for Portuguese Jews. The nonconformist schools educated rather under 400 boys and 100 girls (see Maitland's *History of London*, ed. 1756, p. 1277). Technically their origin cannot be connected with Gouge or with Bray, with the Welsh Trust or with the Society for Promoting Christian Knowledge. But these men and societies were all part of a larger wave of progress which was not limited to England or even to Europe. The Society for Promoting Christian Knowledge extended its educational activities even into the far East (see Strype *passim*), while a German movement analogous to the English was in organic relation to it. August Hermann Francke (*q.v.*) (1663–1727) started his free schools for poor children in 1695, and from the first he was in close correspondence with the Society for Promoting Christian Knowledge (see J. W. Adamson, *Pioneers of Modern Education*, p. 242), and his work was definitely based on religion. It strongly supports the view here adopted that the charity school movement was part of a great renaissance wave extending from the middle sixteenth century into modern times; that while on the one hand Francke's methods reach back to Luther, on the other his methods and his schools have to-day a definite place in Prussian education. Francke gave to elementary education a pedagogical significance that it was not to attain in England until the nineteenth century. In the history of education there are few more significant and far-reaching facts than the revival of elementary education at the end of the seventeenth century, and the outward and visible sign of that revival which is most notable in our eyes is the charity schools of England and Germany, of Gouge and Bray, of Francke and Hecker (*q.v.*). This religious educational movement had its counterpart in the English colonies of America. Indeed, in some respects the movement began earlier in America than even in Wales. The English Parliament in 1649 passed an act for the purpose of "promoting and propagating the gospel of Jesus Christ in New England," and founded a statutory society for the purpose of educating native children. A voluntary rate was levied throughout England to provide this society with funds. The action of the society was ratified by the Crown in 1662, and another voluntary rate granted.

J. E. G. DE M.

The Society for the Propagation of the Gospel in Foreign Parts supported schools in practically all of the colonies, throughout the eighteenth-century colonial period. The educational activities of this society are discussed under COLONIAL PERIOD IN AMERICAN EDUCATION and in the article on the Society. But charity schools, called either by this or other terms, were also of indigenous growth and widely scattered. The school founded by Franklin (*q.v.*) (1749), which later grew into the University of Pennsylvania (*q.v.*), was first called "The Academy and Charitable School of Philadelphia in Pennsylvania"; and the university continued such a school for poor children until late in the nineteenth century. Outside of the New England colonies most free schools were of the nature of charity schools until well into the nineteenth century. But with the opening of the nineteenth century various organizations, such as the Public School Society (*q.v.*) of New York City, undertook the task of educating the children of the poor. While previous to this period the term "poor school" or "pauper school" was frequently used,—the term "charity school" was seldom used in America,— such schools were now commonly connected with the Lancasterian or monitorial schools (*q.v.*), or with various societies interested in the establishment and support of various types of schools for poor children. These, however, are discussed under the appropriate captions.

After the opening of the nineteenth century the greater part of the work similar to that of the charity schools of England was accomplished in American states, outside of New England, by the levying of rates and the payment of tuition of poor children by the public authorities. In many regions schools thus largely attended were known as pauper or poor schools. In the cities the schools controlled by the various school societies fell under the same prejudice, and escaped it finally through its transfer of all authority over such schools to city school boards, the discontinuance of all tuition fees, and the opening of all such schools to the populace at large. This was commonly accomplished by the middle of the century,— in New York City in 1852; in Boston as early as 1817, though the administration was not unified until 1854. In small towns and rural regions the discontinuance of tuition charges and the discrimination between charity pupils and tuition pupils commonly survived until past the middle of the century, and in numerous states was not discontinued by law until after the Civil War.

See FREE SCHOOLS; and the articles on the various state systems of education.

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CHARKOW, UNIVERSITY OF. — An Imperial Russian university founded in 1804 and opened in the next year. Faculties of law, medicine, arts, and sciences are maintained. In 1908–1909 there were enrolled 4537 students and 399 auditors.

See RUSSIA, EDUCATION IN.

CHARLEMAGNE AND EDUCATION. — The reign of Charlemagne ushered in the " Benedictine Age " of learning, which lasted from the close of the Dark Ages to the beginning of the twelfth century Renaissance. Charles initiated a revival of letters which owed its success partly to his own determined will, partly to the skill of the men whom he called to his assistance. Its main features were four: the gathering of scholars from all parts to make the Frankish Court a model for learned Europe; the rehabilitation of the Palace School; the systematic promotion of clerical education; and the fostering of teaching work in both cathedrals and monasteries. As in other matters, so here, Charles' policy was to some extent anticipated under his immediate predecessors. Charles Martel, Carloman, and Pippin had supported the West-Saxon missionary, Boniface, in reforms which, though primarily moral and ecclesiastical, were an essential condition of any literary revival. Under Pippin English and Irish missionaries and other scholars had here and there stirred the dying embers of learning into fresh life, and the Palace School, whose origin is lost in the darkness of the Merovingian age, had acquired increased importance, and had even been endowed by Paul I himself with a collection of Greek Mss. But Charlemagne was the first to make a systematic effort at a real restoration of learning. He himself combined remarkable intellectual powers with a keen craving for knowledge, — and, if he was never able to write with ease, he was as conversant with colloquial Latin as with his native tongue; he knew something of the pure Latinity of scholars; he was not wholly ignorant of Greek; and he was interested on the one hand in the vernacular poetry of his age and on the other in astronomy and kindred studies. But the realization of his aims demanded men more learned, if not more able, than himself. Hence he summoned to his court scholars from far and near. Peter of Pisa, the grammarian of Tuscany; Paulus Diaconus, the Lombard historian; Arno, the Bavarian Archbishop of Salzburg; Theodulph, the Visigothic Archbishop of Orleans; Paulinus, the Patriarch of Aquileia; Clement, " the Scot," and his fellow Irishmen; and many others, — above all Alcuin of York (*q.v.*), the representative of that Anglo-Saxon influence which played so large a part in the movement, — came at his call. All these scholars, perhaps, took part in the revival of the activities of the Palace School, where, in Anglo-Saxon fashion, distinctions of age and race and rank were disguised by the general adoption of biblical or classical pseudonyms. Alcuin, when not in England, apparently directed the school from 782 to 796. It seems to have included pupils differing widely in years and in position, and women as well as men, and the instruction must have varied accordingly from the formal class teaching of boys to the individual tuition of more advanced pupils, the private talks in which Alcuin sought to satisfy his patron's thirst for knowledge, or the general discussions in which the scholars of the Court crossed swords, with the master himself, perhaps, as moderator. In a migratory court, under a warlike monarch, interrupted studies were inevitable, at least for the adult pupils; and it was difficult to carry about a library sufficient for all the branches of study. Yet the school fulfilled effectively two important tasks. It formed the center of intellectual life in the kingdom, encouraging friendly emulation between the scholars who sought Charles' patronage, and bringing all the chief personages of Church and State into living contact with the new movement. And it helped to train up a generation of men who, when scattered far and wide throughout the empire, still kept alive the Carolingian tradition in a dark time.

Charles' insistence on a minimum of education for the clergy, for which the Anglo-Saxon Church supplied a precedent, was perhaps due to Alcuin. The *Admonitio Generalis* of 789 enjoined an inquiry into the *fides et vita* of ordinands, — periodical examinations of diocesan clergy by their bishops, — the establishment of reading schools, the correction of corrupted Mss., and the restriction of copying work to competent scribes; a circular letter, of uncertain date, to church dignitaries (the extant copy is addressed to Baugulf, Abbot of Fulda from 780 to 802), ordered the study of letters in all monastic and episcopal establishments; while other capitularies defined a minimum of learning to be possessed by every clerk. By confining promotion to educated men, and threatening the ignorant with suspension or even deprivation, Charles brought the self-interest of the clergy to the aid of higher motives. His success was remarkable. Cathedral and monastic schools displayed an unprecedented vigor, of which the *scholae lectorum* and *cantorum* of Leidrad at Lyons, the *scriptorium* of Theodulf at Orleans, Alcuin's model abbey school at Tours, and Angilbert's library for a hundred scholars or more at S. Riquier, are only some of the most notable illustrations. Moreover, in the diocese of Orleans and elsewhere, the order of the Council of Vaison (A.D. 529), that parish priests should aid in the work of education, was revived, and one Bavarian prelate even attempted to compel every man to keep his son at school till he was well instructed. And, while Charles' insistence on the careful emendation of Mss. — biblical, liturgical, and educational — tended to secure more uniform and accurate texts, a reform of handwriting began which ended in the triumph of the Carolingian minuscule over the uncial script of the preceding age. A general rise in the standard of learning ensued. A correct Latinity — of which Einhard's Suetonian prose is the leading example — was revived. A knowledge of Greek became commoner than it had been for a century past. Historical writings, inspired perhaps by the work of Bede, multiplied; monastic chronicles were written in East and West; Einhard's own life of Charles set a precedent for secular biography. And if, at first, the movement was essentially conservative, remarkable less for originality than for fidelity to venerated models, this ceased presently to be everywhere the case. In the East Frankish realm, it is true, Alcuin's greatest pupil, Rabanus Maurus (*q.v.*), if more learned than his master, was also still more inclined to prefer acceptance of tradition to discussion and inquiry, and under his successors German learning became increasingly barren, and more and more the professional monopoly of the clergy. Yet in the West the writers of the ninth century — Agobard, with his political tracts; Servatus Lupus, whose letters reveal a love of learning which anticipates the Humanism of the Renaissance; Hincmar and the forgers of the false Decretals; above all John the Scot, in his daring philosophical speculations — far excelled the men of Charles' own time in the variety, brilliance, and originality of their work. This intellectual vigor was indeed only transient. Already the *Capitulare Monasticum* of 817 had tried to shut monastic schools against all except *oblati*, and the political troubles of the time doubtless prevented the fruitfulness of schemes, suggested by bishops and promulgated by synods, for the establishment of "public schools." Danish and Magyar and Saracen invasions, feudal strife and anarchy, the decay of the dynasty, the collapse of the central government, seemed indeed almost to bring back the Dark Ages. But the work of the Carolingian revival was never wholly undone; an unbroken succession of teachers — Rabanus Maurus (*q.v.*), Servatus Lupus, Heric of Auxerre, Remigius — linked Alcuin to Odo of Cluny, and the scholars of the twelfth century only reared a more splendid structure on the solid foundation laid under the eye of Charles the Great, and carried on the speculative movement foreshadowed at the court of Charles the Bald.

C. J. B. G.

See also article on ALCUIN.

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See the references given under ALCUIN.

CHARLES CITY COLLEGE, CHARLES CITY, IA. — Founded in 1891 as a coeducational institution under the auspices of the Methodist Episcopal Church. Preparatory, academic, collegiate, normal, fine arts, and commercial departments are maintained. The entrance requirements into the college are about 12 points of high school work. The college offers classical, philosophical, and scientific courses, leading to their appropriate degrees. There are 12 professors and 7 assistants on the faculty.

CHARLESTON, COLLEGE OF, CHARLESTON, S.C. — Opened in 1790 and continued as a high school until 1824. In 1837 the property, rights, and interests of the college were transferred to the City Council, which agreed to maintain the institution. Approximately 12 points of high school work are required for entrance into the freshman class. Degrees are conferred in arts and science. There is a faculty of 8 professors and 2 assistants.

CHARTER PROVISIONS. — See CITY SCHOOL ORGANIZATION.

CHARTERHOUSE. — One of the nine great English Public Schools. Founded in 1611 by a wealthy merchant, Sir Thomas Sutton. The foundation included a hospital or asylum for old men in addition to the school. The will was contested, but on the advice of Bacon the decision went in favor of the foundation. The site of the school was an old Carthusian monastery. The hospital and the school remained under the control of one body of governors and a master until the Public Schools Act of 1868. The hospital and the Poor Brethren are described in Thackeray's *Newcomes*. The school was intended only for foundation scholars, or gown boys, who were nominated by the governors, and the nonfoundationer was a late introduction. The career of the school has always been marked by success, as evidenced by the large number of old Carthusians who have won a place in the annals of English history. In 1873 the school was removed from London to Godalming, where the numbers increased rapidly under Dr. Haig Brown, who was headmaster for a period of more than 30 years. In 1897, Rev. George Henry Rendall was appointed to succeed Dr. Brown. The school is divided into classical and modern sides, and arrangements are made for preparation for the army and navy examinations.

See Grammar Schools, English.

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CHARTRES, SCHOOL OF. — One of the most famous of the medieval cathedral schools. The title of chancellor in connection with it appears as early as 931, but nothing definite is known of the school until the next century. Fulbert became Bishop of Chartres in 990. He was himself one of the most learned of men in those days, and under his influence the school soon outstripped the schools of Laon and Paris. Its earliest reputation was based on lectures which were given on Hippocrates, Galen, and Sorenus, but Fulbert turned it in the direction of the seven liberal arts. In the twelfth century, however, under Bernard Silvester of Chartres, who was chancellor from 1119 to 1126, the school acquired a unique position as a center of classical scholarship. Perhaps the best account of the work of the school is given by John of Salisbury (*q.v.*), who was at Chartres for three years. The method of Quintilian was introduced by Bernard and was adopted by Theodoric, his brother, and other successors. By this a foundation was laid in grammar and rhetoric for the proper understanding of classical literature, which was widely read. In addition to reading and explaining the grammar and contents of the classics, the pupils practiced writing Latin verse and prose. John's teachers were William of Conches, the grammarian, and Richard l'Évêque, "a man who was master of every kind of learning," and who taught the quadrivium. That Chartres afforded the best opportunity of the time for the study of the seven liberal arts (*q.v.*) is clear. Theodoric, already mentioned, who was chancellor from 1141 to *c.* 1150, was the author of an *Eptateuchon*, a treatise on the seven liberal arts. The doorway of the West Front of the Cathedral was adorned with figures of the seven liberal arts, each represented by some early authority. So far as the studies of the classics are concerned Chartres seems to have been the center of an early Renaissance. Only the new discovery of Aristotle diverted the attention of scholars from the humanities to logic and philosophy and from Chartres to Paris. While it flourished, the school of Chartres contributed to purify Latin style, as is represented by the *Metalogicus* of John of Salisbury. The control of the Cathedral Chapter over the higher education of Chartres continued until the sixteenth century.

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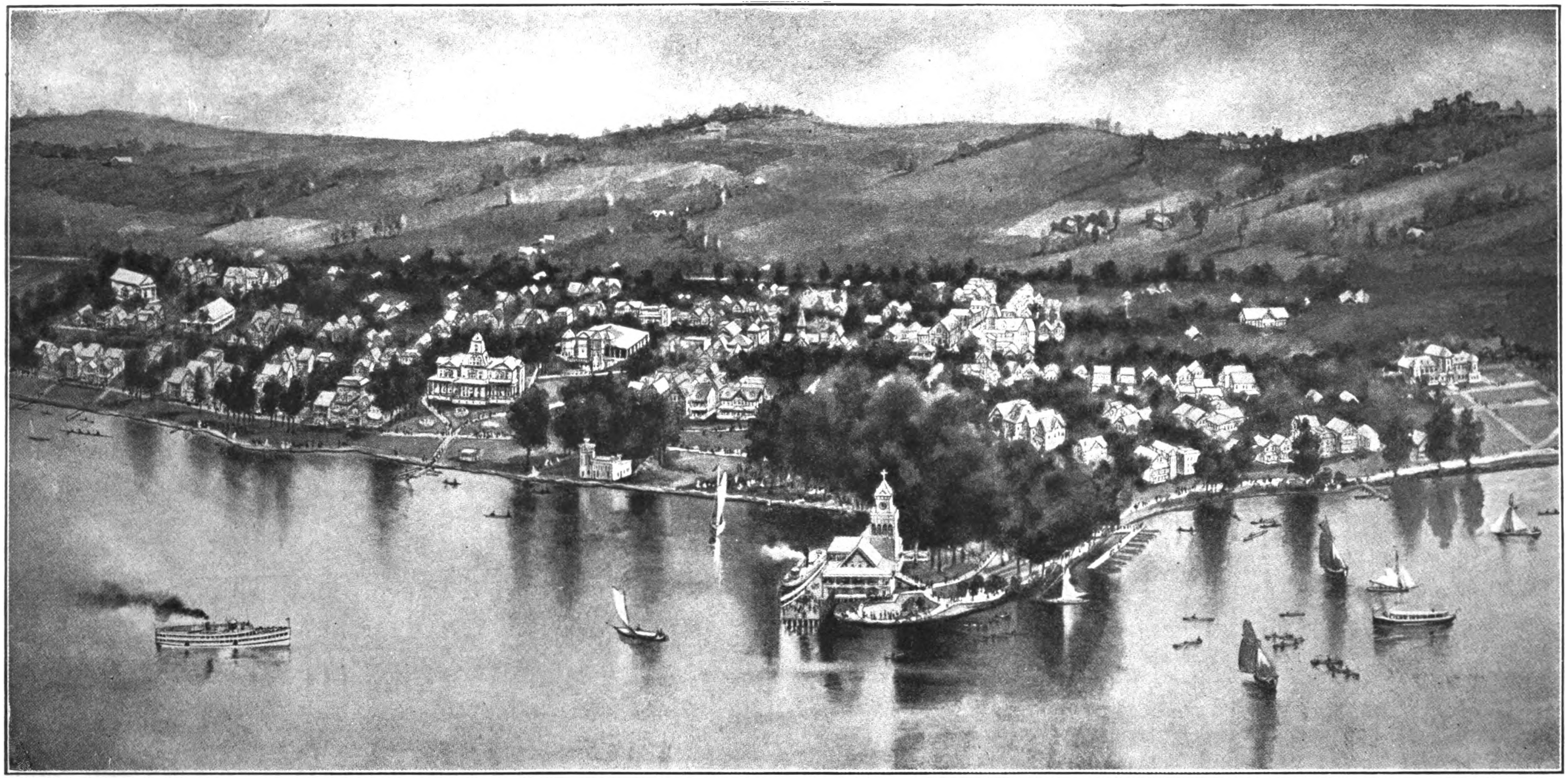
CHARTS, SCHOOL. — See Pictures, Use of; Maps; Objective Methods; Visual Aids to Teaching.

CHASE, THOMAS (1827–1892). — Educator and textbook writer, graduated at Harvard in 1848, and was for 3 years a tutor there. He subsequently studied in Germany and France, and in 1855 became professor in Haverford College and 20 years later president of that institution. He was senior editor of the Chase and Stuart series of classical textbooks.

W. S. M.

CHATTANOOGA, UNIVERSITY OF, CHATTANOOGA, TENN. — A coeducational institution under the auspices of the Methodist Episcopal Church, offering collegiate and professional training. The admission requirements are equivalent to about 14 or 15 units of high school work. Certificates from accredited schools are accepted in lieu of an examination. Degrees in arts, science, and literature are granted in the college. The last year of the college course may be taken in the university, which offers training in law, medicine, and theology. The law course extends over 2 years, and is open to all students of sufficient education to follow the work; but candidates for degrees must be over 21 years of age. The school of medicine gives a 4 years' course to students of sufficient qualifications; with the school is associated the Erlanger Hospital. The theological course extends over 3 years and is open to members of the Methodist Episcopal Church and other denominations. The university has a department at Athens, Tenn., in which a preparatory education of high school grade is given. There were enrolled in 1909–1910 in the Athens school 310 students, in the college 107, in the school of law 130, in the school of medicine 108, in the school of theology 29. There is a faculty of 27 professors, 2 associate professors, and 22 lecturers and assistants. Rev. John H. Pace, A.M., D.D., is the president.

CHAUNCEY, CHARLES (1592–1672). — The second president of Harvard College, was born at Yardleybury, England, in 1592. He was educated at the Westminster School and Trinity



Assembly Grounds, Chautauqua, New York.

College, Cambridge. He was for a time instructor of Greek in Trinity College. He came to America in 1638 and for 16 years engaged in the work of the ministry. In 1654 he was chosen to succeed Dunster (*q.v.*) as president of Harvard College, and this position he held until the time of his death. Author of *Advantages of Schools* and of several theological essays. He died at Cambridge, Mass., on Feb. 19, 1672. W. S. M.

CHAUTAUQUA MOVEMENT.— The methods and ideas of popular education associated with the name Chautauqua are traceable to the original Chautauqua Assembly, its summer schools, and its home reading circle. In the seventies the economic development of the country had created and distributed a margin of leisure to large numbers of Americans who felt the lack of early educational opportunities and vaguely missed contact with the cultural tradition. The Chautauqua plans were proposed at just the right time to give definite stimulus and guidance to thousands of eager, ambitious people.

The Original Chautauqua. — In 1874 the Chautauqua Sunday School Assembly was founded by Lewis Miller, of Akron, Ohio, and Dr. John H. Vincent, now a bishop of the Methodist Episcopal Church. The first session was held for ten days in August on the shores of Chautauqua Lake in southwestern New York. The fundamental idea of the assembly was to afford a broader training for Sunday school teachers, to combine formal instruction with informal conferences, and to provide recreation and entertainment. Although the founders were members of the Methodist Episcopal Church, the assembly was consciously made from the outset unsectarian. Among the speakers were representatives of all the leading denominations. More than 1000 persons interested in progressive Sunday school ideas attended the first session, which aroused an enduring enthusiasm. The next year the plan was continued and extended. Instruction in Hebrew and Greek from a Biblical point of view was begun in 1875. The following year English literature was included. By 1878 French and German had been added to the list of studies, and in the same year courses for public school teachers were inaugurated under the charge of Dr. J. W. Dickinson of Boston. Each successive year saw a lengthening of the session, an enrichment of the popular lecture program, an enlargement of the curriculum of the summer schools. In 1883 the late Dr. William R. Harper became the head of the summer school department of Chautauqua, and for 14 years rendered service of the greatest value in building up the distinctively educational side of Chautauqua work.

The Home Reading Circle. — In 1878 the Chautauqua Literary and Scientific Circle was founded. William Cullen Bryant gave his hearty approval. Lyman Abbott, Edward Everett Hale, and Henry C. Warren were from the first members of the Council. This plan of home reading extending over four years and offering to mature people what was described as "the college outlook" met with instant success. The first year over 7000 readers were enrolled, and within a few years 60,000 were pursuing the prescribed courses of the circle. Each year is organized about some central idea, *e.g.* "The English Year," "The American Year," "The Classical Year," "The Modern European Year." The year's course consists of four books and twelve numbers of a special magazine, *The Chautauquan*, which contains series of articles related to the main topics of the year, bibliographies, excerpts from standard literature, notes, etc. The extension of the library movement, the growth of study clubs and university extension courses, the organization of philanthropic effort have all been aided by the widespread influence of Chautauqua circles. Although the many contemporary forms of popular education have modified Chautauqua's unique, pioneer position, the circle counts a steadily maintained membership of about 10,000 readers.

Correspondence Instruction. — In 1883 under the direction of Dr. Harper correspondence instruction was started. This was continued for several years. At one time, under a charter from the state of New York, Chautauqua was empowered to confer degrees. A few degrees were granted, chiefly to Bachelors of Divinity and to, perhaps, a score of Bachelors of Arts. With the assumption of correspondence instruction by two or three leading universities, Chautauqua was relieved from work of this type and surrendered the degree-conferring power. In 1902 a new charter issued to Chautauqua changed its official name to Chautauqua Institution.

Control, Organization, etc. — Chautauqua Institution is administered by a board of 24 trustees — 20 chosen by the trustees themselves and 4 by the leaseholders of Chautauqua property. The work of the administrative offices is distributed among the following departments: Instruction, Administration, Press, and Grounds and Buildings. The property of the Institution is conservatively valued at about $750,000. The annual income amounts to about $175,000 — the main revenue being divided between tuition fees (admissions to the grounds, and fees in the summer schools), which approximate $75,000; license fees, rents, and commercial concessions, taxes, and service fees, about $35,000; income from the Press about $50,000; sundry income of about $5000. There is no element of private profit connected with the Institution; no stock or dividends; all surplus is devoted to the growth of the work.

A Summer Community. — Chautauqua is a summer community with a maximum resident population of 10,000 to 12,000 people. More than 30 public buildings provide accommodations for the educational work. In 1909 95 instructors offered 188 courses to 2315 students in 13 different schools. In connection with the popular program, there were 197 lectures, 64 religious addresses, 14 illustrated lectures, 41 readings, 6 entertainments, 66 concerts, and 9 sermons. The Chautauqua platform is open to representatives of all sane, disinterested movements for social betterment, and thus serves as a valuable clearing house of ideas which gain rapid and wide distribution because of the nationally representative character of the summer attendance. Chautauqua is more than a summer school and a popular program. It is a community and an institution. From the very beginning the sentiment of loyalty has been fostered by many devices. Ritual, ceremony, processions, anniversaries, songs, have all played their part in developing an esprit de corps which gives the place a distinctive character. The strong religious motive which was present at the beginning has dominated the whole life of the institution. This religious motive has not, however, taken a narrow or sectarian form. The institution recognizes the symmetry of a life which includes intellectual, æsthetic, recreative, associative, as well as distinctively religious elements. It attempts to combine these in the summer into a stimulating and sane environment, and throughout the year to direct and encourage the reading of thousands of persons to whom regular educational opportunities are denied.

The Spread of Chautauquas. The original assembly has been widely imitated until the word " Chautauqua " has become a common noun. In 1909 reports were received from 554 of these Chautauquas, distributed as follows: North Atlantic states 28, South Atlantic 44, North Central 407, South Central 51, Western 24. Canada reported one. There is a British Chautauqua, a combination of the National Home Reading Union and the Coöperative Holidays' Association (*q.v.*) which meets annually at different seaside and country places. It is estimated that in a single season nearly 2,000,000 different people attend the Chautauquas of the United States. These assemblies fall into groups: (*a*) a half dozen which include all or most of the features of the original Assembly; (*b*) a score established 1880–1895 which preserve something of the earlier tradition; (*c*) a hundred or more which add to a popular program a few classes in Bible study, elocution, physical culture, cookery, etc.; (*d*) a large number which confine their attention solely to presenting celebrities and entertainers; and (*e*) the remainder, which are doing the same thing on a lower plane. A few of these Chautauquas are managed by trustees as corporations not for profit, many are supported by towns from local pride, others are purely commercial enterprises, and some are subsidized by street railway companies and Boards of Trade. Save for a merely fraternal " Alliance " which includes 40 of the older and stronger assemblies, these Chautauquas have no connection with each other. There is no central authority to standardize, censor, or organize the 500 platforms. The lecture bureaus by preëmpting and distributing the speakers most in demand, as well as the wide influence of imitation, introduce a good deal of uniformity. During the last few seasons certain political leaders have turned the Chautauqua platforms to account, until the "Chautauqua circuit " has become a part of the current political vocabulary. These Chautauquas are a characteristic and unique feature of American life. They are susceptible of abuse, are sometimes exploited by demagogues, offer a good deal that is commonplace, misleading, and meretricious, but on the whole are centers from which stimulating suggestions, important information, and wholesome entertainment are being distributed to hundreds of thousands of men, women, and children. G. E. V.

The following list contains all the Chautauqua centers reported for 1910. Those printed in italics are members of the International Chautauqua Alliance.

Alabama. — Anniston, Citronelle, Elliott Park, Eufaula, Florala, Gadsen, New Decatur, Talladega.

Arizona. — Bisbee.

Arkansas. — Bentonville, Conway, Eureka Springs, Fayetteville, Fort Smith, Hot Springs, Mammoth Springs, Russellville, Searcy, *Siloam Springs*, Springdale.

California. — Huntington Beach, Long Beach, Millards Canyon, Oakland, Pacific Grove, Placerville, Venice, Yosemite Valley.

Colorado. — Boulder, Cañon City, Fort Collins, Greeley, Montrose, Palmer, Salida.

Connecticut. — Canaan, Plainville.

Florida. — De Funiak Springs, Gainesville, Lake City, Melbourne, Orlando, St. Petersburg.

Georgia. — Albany, Atlanta, Barnesville, Blue Ridge, Douglas, Dublin, Eatonville, Gainesville, Hawkinsville, Mariette, Milledgeville, Newman, Sandersville, Tennelle, Washington.

Illinois. — Aurora, Avon, Camargo (Patterson Springs), Camp Point, Canton, Charleston, *Chautauqua* (Piasa), *Clinton* (Weldon Springs), De Kalb, *Dixon* (Rock River), Effingham, Elgin, *Eureka*, Freeport, Galesburg, Geneseo, Hamilton, *Havana* (Illinois State Epworth League), Hoopestown, Kankakee, *Lincoln*, *Litchfield-Hillsboro*, *Lithia Springs*, Mechanicsburg-Buffalo, Monmouth, Mt. Vernon, Nokomis, *Ottawa*, Pana, Paris, Paxton, *Petersburg* (Old Salem), Plainfield, *Pontiac*, Quincy, Sandwich, *Streator*, Sycamore, Urbana.

Indiana. — Attica, Batesville, Brooklyn, Columbus, Culver, Delphi, Elkhart, Greenfield, Jeffersonville, New Albany, Kokomo, Lafayette, Lake George, La Porte, Madison, Merom, Oakland City, Princeton, Remington (Fountain Park), *Richmond*, Rushville, Syracuse, Terre Haute, Valparaiso, Vincennes, Waveland, Winchester, *Winona Lake*, Zionsville.

Iowa. — Albia, Algona, Allerton, Ames, Anamosa, Atlantic, Audubon, Bedford, Belle Plain, Benson, Bloomfield, Boone, Carson, Cedar Falls, Cedar Rapids, *Charles City*, Cherokee, *Clarinda*, Clear Lake, Clinton, *Colfax* (Iowa State Epworth League), Columbus Junction, Cresco, Creston, Decorah, Dennison, Des Moines, Dubuque, Eagle Grove, Eddyville, Emmetsburg, Estherville, Fairfield, Farmington, Forest City, Glenwood, Goldfield, Greenfield, Guthrie Center, Hampton, Harlan, Hedrick, Humboldt, Ida Grove, Independence, Indianola, Iowa City, Iowa Falls, Jefferson, Lake City, LeMars, Leon, Malvern, Maquoketa, Marceline, Marshalltown, Mediapolis, Missouri Valley, Montezuma, Mt. Ayer, Mt. Pleasant, Muscatine, Oakland, Osage, Osceola, Oskaloosa, Ottumwa, New Hampton, Newton, Northwood, Pella, Perry, Red Oak, Rockwell City, Sac City, Seymour, Sheldon, Shenandoah, Sibley, Sidney, Sigourney, Spencer, Spirit Lake, State Senter, *Storm Lake*, Tipton, *Toledo Tama* (Central Iowa), Vinton, *Washington*, *Waterloo*, Waukon, Waverly, Webster City, West Liberty, West Union, Winfield, Winterset.

KANSAS. — Abiline, Beloit, Blue Rapids, Bonner Springs, *Cawker City* (Lincoln Park), *Clay Center*, Coffeyville, Concordia, Eldorado, Emporia, Fort Scott, Fredonia, Hiawatha, Iola, Lawrence, Manhattan, Newton, Oberlin, *Ottawa*, Paola, Parsons, Peabody, Pittsburg, Salina, Sobetha, Sterling, Topeka, Wathana, Winfield.

KENTUCKY. — Ashland, Glenwood, High Bridge, Kingwood, Lebanon.

LOUISIANA. — Louisville, Monroe, New Iberia, Preston, Ruston.

MAINE. — Fryeburg, Ocean Park.

MARYLAND. — Cumberland, Emory Grove, Glyndon Park, *Mountain Lake Park*, Washington Grove.

MASSACHUSETTS. — Northampton.

MICHIGAN. — Adrian, *Battle Creek*, *Bay View*, Cadillac, Charlotte, Grand Rapids, Hillsdale, Hudson, Jackson, Kalamazoo, Lake Orion, Lansing, *Ludington* (Epworth), Marquette, Owasso, Paw Paw, South Haven.

MINNESOTA. — Albert Lea, Austin, Blue Earth, Clear Lake, Detroit Lake, Fairmount, Green Lake, Luverne, Mankato, Marshall, Minneapolis, Ortonville, Redwood Falls, Rochester, Spicer, Waseca, Willmar, Winona, Worthington.

MISSISSIPPI. — *Crystal Springs*, Gloster, Gulfport, Hattiesburg, Jackson.

MISSOURI. — Arcadia, Aurora, Bethany, Bismarck, Burlington, Cameron, Canton, Carrollton, Carthage, Centralia, Chillicothe, Clarnece, Clinton, Columbia, Columbus, Dexter, Excelsior Springs, Fayette, Fulton, Grant City, Hamilton, Hannibal, Holder, Kahoka, King City, Kirksville, Liberty, Louisiana, Macon, Marceline, Maryville, Marshall, Maysville, Meadville, Memphis, Mexico, Moberly, Monroe City, Montgomery, Mt. Vernon, Neosho, Odessa, Oregon, Paris, Pertle Springs, Pittsburg, Plattsburg, Princeton, Richmond, Rockport, Salisbury, Savannah, Sedalia, Seneca, Springfield, Stanberry, St. Joseph, Trenton, Unionville, Warrensburg, Windsor.

NEBRASKA. — Albion, Ashland, Auburn, Aurora, Beaver Crossing, Bellevue, Broken Bow, Cambridge, Crawford, David City, Elmwood, Fairbury, Fairmont, Falls City, Fullerton, Grand Island, *Hastings*, Holdredge, Kearney, Lexington, *Lincoln* (Nebraska Epworth), Nebraska City, North Platte, Pawnee City, Peru, Red Cloud, Salem, Scott's Bluff, Seward, Takama, Tecumseh, Wahoo, Wayne, York.

NEW HAMPSHIRE. — Hedding.

NEW JERSEY. — Atlantic City (Jewish Assembly).

NEW MEXICO. — Mountainair.

NEW YORK. — Assembly Park, Carmel Grove, *Chautauqua*, Clarendon, Cliffhaven (Catholic Summer School), East Aurora, Findley Lake, Jamesport, Lakeside, Lily Dale, Onondago, Round Lake, Stony Brook, Syracuse, Tulley Lake.

NORTH CAROLINA. — Asheville, Charlotte, Hendersonville.

NORTH DAKOTA. — Devil's Lake.

OHIO. — Alliance, Antwerp, Arcanum, Attica, Batavia, Bellefontaine, Bethesda, Bowling Green, Bucyrus, Cadiz, Cambridge, Carrollton, Carthage, Celina, *Chautauqua* (Minai Valley), Chillicothe, Clarksburg, Conneaut, Coshocton, Covington, Cumberland, Cayuhoga Falls, Defiance, Dresden, Epworth Heights, Fayette, Freeport, Galliopolis, Georgetown, Greenfield, Hillsboro, *Lakeside*, Lancaster, Lima, Mansfield, Marysville, Massillon, Millersburg, Millersport, McConnellsville, Mt. Gilead, Mt. Pleasant, *Mt. Vernon* (Hiawatha Lake), Montpelier, New Philadelphia, Newtownville, Orrville, Peebles, Plain City, Portsmouth, Ruggles Beach, Scio, Sidney, Smithville, Somerset, Springfield, Steubenville, Van Wert, Tiffin, Urbana, Wellston, Wilmington, Woodsfield, Yellow Springs.

OKLAHOMA. — Berlin, Guthrie, Hobart, Lawton, McAlester, Muskogee, Sulphur, Tulsa, Vinita.

OREGON. — Ashland, Astoria, Oregon City.

PENNSYLVANIA. — Eagles Mere, Ebensburg, *Mount Gretna* (Pennsylvania), Pocomo Pines, Ridgeway Park, Salix.

SOUTH CAROLINA. — Johnston, Spartanburg, Williamston.

SOUTH DAKOTA. — Big Stone, Canton, Columbia, Forestburg, Hot Springs, Madison.

TENNESSEE. — Bristol, Jefferson City, *Monteagle*, Nashville.

TEXAS. — Paris.

VIRGINIA. — Lexington, Purcellville, Petersburg, White Post, Wythesville.

WASHINGTON. — Birch Bay, Puget Sound, Seattle.

WEST VIRGINIA. — Elkins, Fairmount, Parkersburg, Roncoverto, Shenandoah, Wellsburg, Wheeling.

WISCONSIN. — Chetak, *Delavan*, Eau Claire, La Crosse, Manitowoc, *Marinette* (Northern), Platteville, Racine, Watertown, Waukesha, Waupaca.

WYOMING. — Cheyenne.

CANADA. — Grimsby Park.

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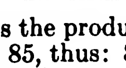
CHEATING. — See HONOR SYSTEM; SCHOOL GOVERNMENT.

CHECKS ON COMPUTATIONS. — In practical computation it is necessary to verify the results, and this is done by various means, known collectively as "checks." In general a theoretically good check is some form of inverse operation; thus, if we add a column upwards we may check it by adding downwards, or we may check subtraction by addition, and division by multiplication. For example, if $1728 \div 144$ is found to equal 12, we may check this result by seeing if $12 \times 144 = 1728$. Practically, however, the inverse operation is often too long to be used easily, and recourse is had to simpler means, particularly in the cases of multiplication and division. The check most commonly used in the early schools, and now coming into use again, is that of "casting out nines." It is applied practically as follows: —

$$\begin{array}{r} 786 \\ \underline{85} \\ 3930 \\ \underline{6288} \\ 66810 \end{array}$$



If we wish to know if 66,810 is the product of 85 and 786, we add the digits in 85, thus: $8 + 5 = 13$, and add the digits in 13, having $1 + 3 = 4$. This gives us the remainder that arises from dividing 85 by 9, as is evident in this case inasmuch as $85 = 9 \times 9 + 4$. Write this 4 at the right of the cross. Proceed in the same way for 786; $7 + 8 + 6 = 21$, and $2 + 1 = 3$, and this is the excess of nines in 786. It may more easily be found by taking $7 + 8 = 15$, and "casting out nine," leaving 6; then taking $6 + 6 = 12$, and "cast out nine," leaving 3. Write this 3 to the left of the cross. Now take 3×4 (the product of the excesses of nine), and this equals 12, of which the "excess of nine" is 3, which write at the top of the cross. The excess of nines in the product, 66,810, must equal this number (3) if the work is correct. This is the case, since $6 + 6 = 12$ (excess 3), and $8 + 1 + 0 = 9$ (excess 0). The proof of this law is a simple matter, and depends upon two principles: (1) The excess of nines in a number is the excess in the sum of its digits, which is evident inasmuch as any number may be represented by $a + 10b + 10^2c + 10^3d + \dots$, or $a + b + c + d + \dots + 9b + 99c + 999d + \dots$, where the only remainder arising from dividing by 9 must arise from dividing $a + b + c + d + \dots$ by 9. (2) The excess of nines in a product equals the excess in the product of the excesses of the factors, which is evident because any two numbers may be represented by $9a + b$ and $9x + y$, and the product will then be $9^2ax + 9(xb + ay) + by$, which is all divisible by 9 except by, and this is the product of the excesses. This check is easily used by children, and a sufficiently simple inductive explanation is easily given. It checks most of the common errors, but of course does not check one that arises through a cause that does not affect the excess of nines, like an extra 0, or 9, or a transportation of figures. It evidently applies also to division and to other operations. There is also a check of elevens, and this is better than that of nines in some respects, but it is not so readily applied.

The check of nines goes back to India. Thence it was introduced into the Arab schools, and thence into Europe. It was almost invariably found in printed arithmetics before 1600, and Paciuolo (*q.v.*) speaks of it (1494) as *corrente mercatoria e presta.* In the first native American arithmetic (Greenwood, 1729) much use is made of it, and in the eighteenth century it was apparently well known in our schools.

Educationally the use of checks is to be recommended. They detect a large per cent of errors, and the effect on the pupil is salutary. He becomes more confident of his results and more careful in his work, if he discovers his own errors without waiting to have them pointed out. In the business of computing much use is made of checks, so that the subject has a definite practical value. D. E. S.

CHEEVER, EZEKIEL (1614–1708).— Schoolmaster, born in London on Jan. 25, 1614, and educated at Cambridge University. He came to America in 1637, and a year later he opened a grammar school at New Haven "to prepare young men for college." The school was semi-public, the town paying from £20 to £30 a year, "while parents who were able were assessed a certain rate according to the time of attendance and number of children." In 1650 he was called to Ipswich, Mass., to take charge of a grammar school which had been established by grants of the town and donations from public-spirited citizens. In 1661 "after making the free school in Ipswich famous in all the country and making that town rank in literature and population above all other towns in the county of Essex," he was called to Charlestown to take charge of the free school. He was called to the principalship of the Boston Latin School in 1670, and held this post for 38 years. His compensation from the town was "sixtie pounds p. an. for his service in the schoole out of the towne rates, and rents that belong to the schoole, and the possession and use of ye schoole house." Under Cheever the school became "the principal classical school not only of Massachusetts Bay, but of the British Colonies and of all America." Mather says of him, "He had been a skilful, painful, faithful schoolmaster for seventy years, and had the singular favor of heaven, that though he had usefully spent his life among children, yet he was not twice become a child, but held his abilities, in an unusual degree, to the very last." Besides a volume of three essays on religious subjects, he was the author of *A short introduction to the Latin tongue for use in the lower forms in the Latin school, being the accidence, abridged and compiled in the most easy and accurate method,* which, for more than a century, was the most popular Latin textbook in use in America. President Josiah Quincy of Harvard College says of an edition of the *Accidence* which appeared as late as 1838, "It is distinguished for simplicity, comprehensiveness, and exactness; and, as a primer or first elementary book, I do not believe it is exceeded by any other work." Cheever died Aug. 21, 1708, and "was buried from the school house, the Governor, Councillors, Ministers, Justices, and Gentlemen being there."
W. S. M.

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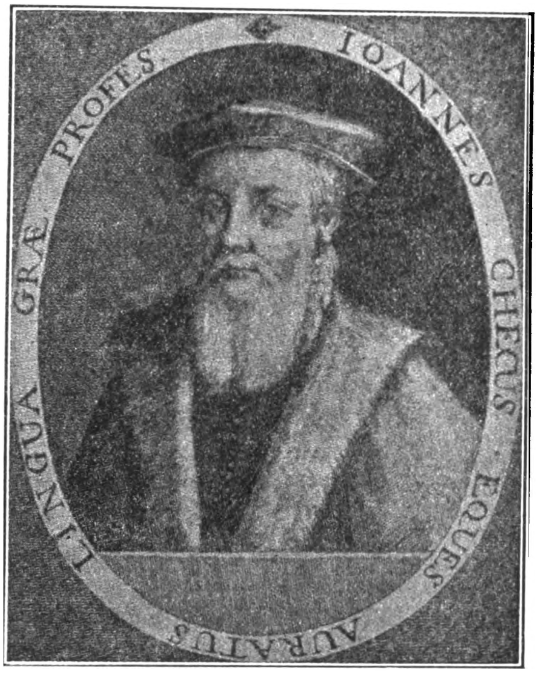
CHEEVER, GEORGE BARRELL (1807–1890). — Theologian, graduated from Bowdoin College in 1825 and at the Andover Theological Seminary in 1830. He was chiefly engaged in religious activity, and wrote numerous works on the religious education of children. The most important was *Right of the Bible in our Public Schools* (1854). W. S. M.

CHEKE, SIR JOHN.— One of the chief Greek scholars in England in the sixteenth century.

Born in Cambridge in 1514, he proceeded to St. John's College, where he became fellow and tutor. His influence in the college was strong, and Ascham says of him that he " laid the very foundations of learning in that College." But he soon attracted attention in the university. He was appointed university Greek lecturer without a salary, but on the foundation of Regius Professorships in 1540 he was made Professor of Greek at a salary of 40*s.* a year. In 1544 he became Public Orator, in which office he was succeeded by Ascham, when in the same year he received a royal summons to undertake the tutorship of Prince Edward. On his departure Ascham regrets the withdrawal of " our most help and furtherance to learning." From this time, with the exception of a few years during the reign of Queen Mary, Cheke enjoyed royal patronage. In 1549 he was appointed Provost of King's College, Cambridge, and in 1552 was knighted. During Mary's reign he was twice imprisoned in the Tower and compelled to return to the Roman Church. The shame of his recantation brought about his death in 1557. His services to the restoration of Greek were great. He not only turned the attention of his students to the best that the classical literature could offer, but contributed largely to save the pronunciation of Greek from the confusion and corruption into which it had fallen. Although his efforts in the direction of reform met with strong opposition from the Chancellor, the reformed pronunciation ultimately prevailed. Again on the testimony of Ascham, Cheke read Homer, Sophocles, Euripides, Herodotus, Thucydides, Xenophon, Isocrates, and Plato with his students. In addition to his interest in the restoration of Greek, Cheke directed his attention to the reform of English spelling and the purification of the English language of non-Saxon elements. For this purpose he translated the Gospel of St. Matthew into this reformed English. Although his writings were numerous and consisted mainly of translations from Greek into Latin, Cheke's most important work was the letters to the Bishop of Winchester on the Greek pronunciation controversy; *de pronuntiatione Graecae potissimum linguae disputationes cum Stephano Wintoni episcopo, septem contrariis epistolis comprehensae, magna quadam et elegantia et eruditione refertae.* (Basle, 1555.)


IOANNES CHECUS EQUES AURATUS LINGUA GRÆ PROFES

Sir John Cheke (1514–1557).

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CHEMISTRY. — As a University Subject; its History, Scope, and Status. — Probably no science possesses, in any two institutions of university rank, exactly the same scope and status, and none is therefore taught by any two men from exactly the same viewpoint or with exactly the same aims. In the case of chemistry, however, the innumerable applications of the science in industry, agriculture, medicine, pharmacy, and the like, introduce an unusual number of possibilities of variation. Hence, it follows that, aside from the art of chemical analysis which is common to all applications, there is much variability in the aspects of the subject which, in different institutions, receive the greatest emphasis. In discussing the place of the science in institutions of learning, it will simplify matters if we treat first the history, scope, and status of pure chemistry, and then take up the same aspects of the various branches of applied chemistry. In connection with the former, we shall consider, in succession, the organization of the instruction and the content of the chemical curriculum, adding some remarks on the development in each of these respects in different countries.

Pure Chemistry in the University. — The first courses in chemistry as a distinct subject of study were given to students of medicine and of pharmacy, and in the eighteenth century separate chairs of chemistry, established for the instruction of such students, became common. Students not of those classes could obtain a knowledge of the science from no other source. The teaching was, however, wholly by lectures. No laboratory work was offered, and even such slight practical knowledge of the science as lecture experiments afford was almost nowhere obtainable. Rouelle (1703–1770) was the first, and for long almost the only chemist who exhibited and explained the phenomena of chemistry, instead of merely describing them. Gay Lussac and Thénard continued the practice, and Liebig writes with enthusiasm of the experimental lectures of the former. This great improvement in the mode of instruction was introduced in the beginning of the nineteenth century into England by Davy, and was there brought to a high state of perfection by Hofmann (1845).

Up to the end of the eighteenth century, no university had provided means or accommodation for the training of chemists, and even after that, progress in this direction was very slow. Many who subsequently attained fame, such as Vauquelin, Liebig, and even Frankland (in 1840), began their careers as students by the toilsome and relatively barren route of apprenticeship to an apothecary. It was Thomas Thomson, the early historian of chemistry, who opened in Edinburgh (1800–1807) the first laboratory for the teaching of the science. After his call to Glasgow, he did a like service for chemistry in the west of Scotland. Far more influential was the laboratory established by Liebig at the University of Giessen (1824). The example of these early attempts was followed slowly. In 1833 Graham brought the idea from Glasgow to London. In 1840 Liebig found Berlin still without accommodation for the training of students. In France, even in 1869, Wurtz reported only one laboratory as being properly equipped for instruction. In America the first nonprofessional institution to establish a chair of chemistry was Princeton (1795), and the first laboratory for instruction was that of Horsford in the Lawrence Scientific School (1848).

In Giessen, the inspiring personality of Liebig attracted so many students that the devising of *a systematic course of instruction* became necessary. The learner began by preparing some of the gases, and then underwent a systematic training in qualitative analysis. Exercises in quantitative analysis and in the preparation of chemical substances followed, and the pupil was ready to begin some original investigation under Liebig's direction. As other laboratories arose, this curriculum was everywhere copied, and remains to this day, after the lapse of nearly a century, the universal method for the training of chemists. With the exception of the qualitative analysis, however, little is known of the details of these courses. Will's treatise (1840), embodying the exercises in qualitative analysis, gave to this part of the curriculum a disproportionate publicity. This book was used, in the original or in translation, in every laboratory, and the preliminary training in inorganic chemistry, essential though it was, not having been provided with similar means of transplantation, was ignored and omitted. On the other hand, the exercises in preparing pure substances, which preceded the research, were most necessary at that time, for the chemists had to make their own reagents, like ferrocyanide of potassium, their own pure mineral acids, and even their own "spirits of wine" for burning. In spite of the fact that every substance required by the analyst, and almost every substance required for research, can now be purchased, a course entitled " Preparations " is still given in every university. Thus, Liebig's course was first distorted, and then, as distorted, was preserved in stereotyped form, regardless of reason and of changed conditions. In Germany a few chemists are only now awakening to the situation; in Great Britain preliminary training in inorganic chemistry is becoming common; in the United States it is practically universal.

The universities, responding to the development of the science, have added organic and physical chemistry to the branches recognized by Liebig's curriculum. After the middle of the nineteenth century, the study of the compounds of carbon, indeed, was pursued with such vigor that within a few decades separate chairs of organic chemistry were established in many universities, and the volume of original work in this branch of the science became so great as to exceed that in all other branches put together.

In most of this work, the physical means of observation and experiment, on which the chemist depends for his information, were very limited. They were such as weighing, filtration, distillation, and observation of melting points, boiling points, and crystalline form. Other methods were not unknown, but the next development, toward the end of the nineteenth century, consisted in the application and more general adoption of a wider range of methods. Index of refraction, power to rotate the plane of polarization, electrical conductivity, and electromotive relations, were measured and the results received chemical interpretation. Methods of studying speeds of chemical reaction, conditions of chemical equilibrium in gases, in solutions, and in complexes like alloys and steel, were devised. Thermochemistry emerged from the routine into which it had fallen, and thermodynamic chemistry arose. The enlarged experimental machinery and the greatly elaborated chemical theory, which interpreted the results, were so marked a departure from the modes of work and thought of the organic chemist and of the analyst that they constituted a new phase of the science and received the name "physical chemistry." The greatest single impetus which this new development received came from the founding of the *Zeitschrift für physikalische Chemie* (1887) by Ostwald, and the Leipzig laboratory, although only one of many seats of physico-chemical work, was the most active and influential. The movement quickly affected university policy, and the Prussian Ministry of Education, for example, decided to establish in every university a separate chair of physical chemistry, with rank equal to the older chairs of inorganic, analytical, and organic chemistry.

The latest phase of chemistry, dealing with radioactivity and radioactive substances, of which radium is the most familiar example, has already made a large place for itself in many universities, and courses of instruction and opportunities for research along this line are now offered in many laboratories.

The chief glory of German university chemistry has been the unrelaxed devotion to research and the ample means which there, as in no other country, has been at the disposal of the investigator. It was this that made Germany for years the Mecca of all who desired a complete training in chemistry. In other countries, parts of Liebig's program were adopted, but the stage of research, in the interest of which the whole program was originally devised, for lack of men, means, and encouragement, was seldom reached. In Great Britain, many new laboratories have been erected, new chairs are being founded, and better facilities for research are therefore being offered. In France, the bureaucratic government of the universities has hindered development, but every branch of chemistry, and all stages of advancement in training, are represented. In Italy, chemistry has shared in the general scientific revival, and all phases of the subject are taught in the universities, and research is pursued with enthusiasm. In Japan, whether we consider the size and reputation of the chemical staffs, or the facilities which they enjoy, the universities put to shame the majority of the educational establishments of the Old World.

In the United States, prior to the founding of the Johns Hopkins University, students went to Germany for their training. Since that period, the development of the graduate school of Harvard University, and the founding of Clark University and of the University of Chicago, have led to a great development of higher education. In a number of institutions, training in chemistry, which is in all respects equal, and in some respects superior, to that given in Germany, can now be secured. Magnificent laboratories are dotted over the country from coast to coast, chairs in every branch of chemistry are numerous, and facilities for and guidance in research are accessible to all who possess the necessary ability.

Chemistry related to Medicine. — Medicine is based on three fundamental sciences: chemistry, physiology, and anatomy. At present, the amount of pure chemistry, and especially of practical chemistry, legally required in the training of physicians in Europe is very small. Usually, a five months' course suffices. In the United States, in the better class of institutions, a year of general chemistry, some qualitative analysis and organic chemistry, and in many cases also quantitative analysis, each with appropriate laboratory practice, with a staff and facilities for giving this amount of work, are considered necessary. But this is only the pure chemistry, introductory to the technical courses. The latter may be roughly divided into two kinds. Chemical physiology deals with the chemistry of the normal organism. Chemical pathology deals with the chemical changes connected with disease, with the chemical effects of bacteria within and without the body, and with similar problems. Courses in immuno-chemistry and other subjects are given, and chairs exist for their cultivation. In all these lines, chemical methods of experimentation and of reasoning are applied to special classes of substances and processes. It is at present impossible to foretell precisely where the dividing lines will be drawn, and what distinct branches will ultimately crystallize out of the rapidly developing region of biochemistry.

Chemistry and medicine come together also in the examination of water and of foods, and in other matters pertaining to the chair of public health or hygiene. Again, pharmaceutical chemistry deals with the preparation, analysis, and standardization of drugs, and is represented in all schools of medicine and of pharmacy.

Agricultural chemistry, which deals with the analysis and chemistry of soils, fertilizers, and crops, is taught in comparatively few universities. It is an important part of the work of the schools of agriculture, which are frequently of university rank, however, and is there associated with instruction in the necessary pure chemistry, and particularly with training in analytical chemistry.

Chemical Geology, Mineralogy, and *Crystallography.* — In no science does chemistry play a greater part than in geology. The study of the modes of deposition and transformation of the materials found in veins, including gold, silver, and ores of other valuable metals, is a chemical problem of the greatest economic and scientific importance. The formation of salt deposits and sedimentary rocks, and the origin and constitution of igneous rocks are chemical questions, and are studied in the laboratory as well as in the field. Chemical geology is therefore a recognized university subject. Again, mineralogy is simply chemistry limited to substances which occur in nature. It treats of the formation, the chemical constitution, and the chemical classification of such substances. Crystallography is by tradition attached to mineralogy, and in the universities is most commonly taught in connection with it. But all pure substances, when solid, have crystalline forms, and the study of such forms and of their relations is a branch of the study of the substances themselves, that is to say, it is a branch of chemistry. In a few instances, indeed, chemical crystallography is a distinct subject of instruction and research.

Technological Applications of Chemistry. — The appearance of chemistry in connection with instruction in industrial subjects is so constant that only a few of the more conspicuous cases can be mentioned. Where the school of technology is not a part of a university, it is usually of university rank. In Germany, indeed, technical chemistry was formerly a department of most of the universities, but when the separate schools of technology were established, these chairs were given up. In the technical schools, complete departments of pure as well as of applied chemistry are maintained, the former being equal in all respects to those in the universities. One of the most important branches of industrial chemistry is metallurgical chemistry, which deals with the extraction, preparation, and application of metals. A special subdivision, known as metallography, applies physical chemistry to the study of alloys and mixtures like steel. Other branches can only be named, although naming them gives little idea to the layman of the great extent of the fields they cover, of their commercial importance, or of the large drafts which the study of them makes upon pure chemistry. They are such as the chemistry of fuels, natural waters, soda and alkalies, soap and bleaching materials, lime and cement, glass and pottery, pigments, paints, and varnishes, spirits, oils, gums, and waxes, starch and sugar, brewing, wine-making, and distilling, explosives, dyes and dyeing, paper, leather, and glue. The manufacture of these substances, from the purchase of the raw materials, to the testing of the finished product, is controlled by the chemist. In composite establishments, like railways and packing houses, where supplies of various sorts are used, the chemist again controls the purchasing by scientific specifications, tests the materials received, and studies the uses to which they are put. He applies to innumerable ends the discipline, the principles, and facts which he has derived from the university or technical school.

The number, diversity, and importance of the various divisions of chemistry, of which the chief have been briefly characterized, is, after all, not surprising. Chemistry deals with the changes in composition of matter, and with the conditions which cause or accompany such changes. Every one of the physical or natural sciences deals with some aspect of matter or some class of materials, and must therefore present an opportunity for fundamental chemical work. There is even a chemistry of the stars, which is experimental as well as observational. What wonder then that in the university, while the center of chemical work may lie in the department of pure chemistry, the scope of the science is limited only by the extreme boundaries of all the departments of science, pure and applied, which such an institution ever includes.

Chemistry in the Schools. — Chemistry gained entrance to the secondary schools as a fragment of a very slight course in physical or in general science. The purpose of the course was informational solely. With the establishment of modern, as distinct from classical curricula, chemistry has slowly gained greater recognition.

The first secondary school to open a laboratory for individual work of the pupils was the City of London School (Mr. Hill, 1847). The first of the English Public Schools to take this step was Rugby (Canon Wilson, 1860). In the United States, the Girls' High and Normal School of Boston (1865) led the way in this important particular. At the present time, chemistry is taught as a distinct subject, with laboratory work, in the majority of the English Public Schools, in nearly all the local high schools of Great Britain, and in all the larger high schools of the United States. The aim is to teach elementary chemistry, as well as to make the science a means of general education. (See CHEMISTRY, METHODS OF TEACHING.)

In Germany the teaching of science was introduced into schools toward the end of the sixteenth century with the rise of the *Ritterakademien*, but was not firmly established until the spread of the *Realschulen* (*q.v.*) began. Science, however, was taught as an undifferentiated mass covering every branch which comes under that name. Chemistry could not receive separate treatment in the schools, so long as it was kept in the background at the universities. An impetus to the teaching of chemistry in the higher schools was given by the increasing importance of the subject in industry. In 1822 chemistry was introduced definitely in the reorganized *königliche Realschule* of Berlin. The subject did not become generally established in all the secondary schools until the *Syllabus* of 1882 was passed. The realistic tendency was further confirmed by the *Syllabus* of 1892, reinforced by the decree of the Kaiser issued in 1900.

The following numbers of periods are given to natural science in the different types of schools. No definite assignment is made to chemistry, with the exception of that here mentioned. In the gymnasium two hours a week are given; in the real-gymnasium, 2 hours a week in the first 5 years, 4 in the sixth, and 5 in the last 3 years. In the real-schools 2 hours a week for the first 4 years, 4 in the fifth, and 6 in each of the remaining years are allotted to natural science. In the gymnasiums chemistry is still included in the general subject of natural science. In the real-schools of the three different types the subject becomes differentiated in *Sekunda*, and is then taught for 2 hours a week. Individual laboratory work is frequently done, but many schools have no laboratories, and some do not use those which they have. The science is taught in all schools in the classroom, but not for its own sake so much as for calling out the powers of observation and of reasoning of the pupils, and for teaching exact expression. Even where laboratory work is offered, the experiments are repetitions of those shown in the classroom, and the work is optional and is usually taken by very few of the pupils.

In France the interest in modern studies dates from the encouragement given by Sully, the minister of Louis XIV, to trade and industry. Richelieu on one occasion wrote that in a well-regulated state there was a need of more masters of the mechanical arts than of the liberal arts. From that time facilities for the training suitable to industry and agriculture began to be demanded. In 1762 Rolland, as the result of an inquiry into secondary education, found that all pupils of all ages were put through the same course, involving for many waste of time and no benefit. Both Talleyrand (*q.v.*) (1791) and Condorcet (*q.v.*) (1792) proposed schemes of education involving experimental chemistry. In 1793 the subject was included in a decree on secondary education, and ever since has found a place to a greater or less extent in the program of the secondary school. The attitude toward chemistry, as to the sciences generally, as subjects of instruction, has been determined by their applicability in industrial, commercial, and agricultural life. Until 1847 no special facilities were offered in the secondary schools for specializing in science. By a statute of that date a bifurcation was introduced in the last three years of the course, so that in one division greater attention was paid to science (*enseignement spécial*). Further emphasis was placed on these subjects after the expositions of 1855 and 1862, as a measure to promote the progress of French industries. In 1880 4 hours a week were given to science in all the classes except the highest, which received 10 hours. In 1886 in the *enseignement spécial*, 2 hours a week were given to chemistry from the third year. Under the reorganization of 1902 there are assigned 3 to 5 hours to physics and chemistry, together, in the special modern-scientific course. In the undifferentiated course 2 hours a week are given to classroom work in physics and chemistry, although only one fifth of the time is given to the latter. Only in the upper cycle is laboratory work introduced, and this to the extent of only 2 hours per week for all the sciences together. The aim of the teaching is informational.

Methods of Teaching Chemistry. — Before methods of teaching are actually discussed, we must note the fact that the kinds of chemistry taught in the secondary schools of the United States and of Great Britain are, in typical cases, essentially different. Apart from the fact that the lecture method is not generally used in imparting the instruction, the chemistry of the American high school is, in its essence, simply a lighter university course. In the secondary schools of Great Britain, greater emphasis is laid on mental training and on arousing scientific habits of thought, and less consideration is given to how far a complete survey of the outlines of the science is accomplished. This difference appears clearly in the books of the two countries, respectively. The books most used in the United States, of which those by Remsen, Newell, McPherson and Henderson, and Brownlee are typical samples, offer simply a scientific treatment of the elements of the science. They differ from university books, like Newth, Richter, Remsen (*College Chemistry*), and Smith, mainly in being much more limited in scope. An American syllabus, such as that of the National Education Association, which is identical with the one used by the College Entrance Examination Board of the Middle States and Maryland (*q.v.*),[1] seems to define secondary school chemistry of the same conventional type. On the other hand, some of the English books, of which those of McNair, and Perkin and Lean are types, place the chief emphasis on pedagogical qualities. The conventional methods of treatment are conspicuous by their absence. A British syllabus, such as the *Alternative Elementary Course* of the Board of Education in England and the Irish syllabus, emphasizes training in scientific method rather than the completion of a systematic outline of the science. The science work in the secondary schools of France and Germany presents no distinct types of instructional method, except those which, like the frequent substitution of classroom work for all laboratory work, are generally acknowledged to be anachronisms.

In spite of this difference between the purposes of elementary chemistry instruction in the secondary schools of the two English-speaking countries, there are many matters of method which are necessarily in more or less universal use, and which even appear with little change in the elementary course of the university. We proceed, therefore, now to discuss the fundamental methods of all elementary chemistry instruction, noting when we reach them those points in which the treatments in the two countries differ.

A more complete treatment of all of these subjects, together with references to all the available sources of information and suggestion, will be found in *The Teaching of Chemistry and Physics* by Alexander Smith and E. H. Hall. This general statement will take the place of separate references to various parts of this book, which would otherwise have to appear in almost every paragraph.

The Means of Instruction. — *The Laboratory Work.* — A description of the modern laboratory would be out of place here. The articles by Baskerville and Gill contain important information not included in Smith and Hall. In general it may be said that, if means are available, the fittings of the laboratory should be as complete as they can be made. At the same time it may be noted that a magnificent laboratory does not necessarily prove that even passable instruction is being given. Satisfactory work can be done with simple appliances and simple fittings. The completeness of the equipment of the laboratory affects the quantity of work which can be done by a student in a given time, but not, in anything like the same degree, the quality. The indispensable things are water and gas, or some substitute for the latter, and a sufficient amount of apparatus to enable instructive experiments to be done. It is also important that system and order should prevail in the minutest details of everything connected with the laboratory materials and appliances.

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[1] For the full titles of some of the books referred to, see the Bibliography at the end.

The laboratory furnishes the basis for all the real knowledge of chemistry which the pupil acquires. It is here only that he comes in immediate contact with the subject. The whole course is so arranged in relation to the laboratory work that the other means of instruction are subsidiary to it and appear, in relation to it, in the light of subordinate and supplementary agencies. Thus, the discussions in the classroom interpret the personal observations; the experimental demonstrations are extensions of them; and the reading in the book is simply for the amplification of the knowledge which the laboratory work furnishes. Those facts and conceptions which are not derived directly from the laboratory work — and they are many — nevertheless depend for their full apprehension, and for the possession of life and reality, on the fact that they are shown to be made up of features encountered in various actual experiments. All real knowledge in chemistry is either obtained by experiment, or by the application of experimental knowledge through the use of the imagination.

That the laboratory work may retain this dominant position in the system of instruction, it must be adequate in scope; it must amply illustrate the facts about each element and compound found in the syllabus; it must contain examples of all the classes of facts which are to be represented in the course; and it must deal with every important principle or law in like manner. It is in this last respect that most laboratory outlines are notably deficient. Yet the laws and principles, being of a more or less abstract nature, demand illustration more urgently than do the single facts. The quantitative laws of chemical composition, to the discussion of which so much time is applied and the use of which, as they express themselves in formula and equation, is so constant, are too often ignored. Quantitative experiments, and the proper utilization of the data which they give, are indispensable parts of the laboratory work.

The directions for laboratory work should be so simple, clear, and full that the experiments can be done with the minimum of individual supervision. The object of the experiment, the apparatus, the kind and quantity of the materials, and the method of manipulation should be clearly explained. This part of the directions is important in order that we may be certain that each separate pupil has before him exactly the desired phenomenon. Question marks should call attention to the matters to be observed, and direct questions, calling for reflection, should be asked. The questions should be of two kinds, which should be carefully distinguished. One class includes questions, the answers to which are obtainable by observation and reasoning alone. The answers to the other class of questions will require reference to the book, or some other source of information, as well. The pupil requires to be notified which sort of question he is handling, in order that he may not, on the one hand, use the book when he should be employing his own eyes or head, or, on the other hand, endeavor to answer from his own observations, supplemented by a little speculation, a question which calls for actual information that he is not in a position to supply.

The laboratory work should be an intellectual occupation. Every device must be used in order to make it impossible for the pupil to feel that he has satisfied the requirements of the course by the mere performance of certain mechanical operations. The outline, and the subsequent treatment of the experimental results by the instructor, should demand the use of intelligence and should assist in its cultivation. In this connection, the type of laboratory work prevailing in Great Britain has a great advantage over that commonly employed in the United States. In the former case, the pupil cannot help feeling that he is wrestling with a problem and mastering it step by step. He covers a smaller number of topics, but his experience with each is most conspicuously an intellectual effort. In many British schools, the so-called heuristic method (*q.v.*) is employed to a large extent. This method has been placed prominently before the teachers, and has been widely introduced, mainly through the influence of Professor Armstrong. The principle is that of investigation, with the encouragement and advice of the teacher, the whole being conducted in such a way that the pupil is, as far as possible, held responsible for defining the problem at each step and for devising means of solving it. By this means less ground is covered in a given time than by the conventional method, but interest and enthusiasm are more easily aroused and educational ends, as distinct from informational ends, are better served.

In all laboratory work the experimental technique must receive special attention. The pupil should learn to discover when an apparatus is air-tight, the difference between the behavior of thick and thin glass when heated, how to fold a filter paper, how to bend glass tubing, and how to weigh. The proper performance of these and other operations is necessary to the success of the experiments, and at the same time a consideration of experimental precautions furnishes valuable opportunities for mental training.

The notebook is an important feature of laboratory instruction. It furnishes opportunity for exercise in simple and correct expression, and it enables the student also to practice the technical language of the chemist, and so imperceptibly to acquire some of his habits of thought. The preparation of the notebook is still further educative because it involves analysis of the observations made in the laboratory and organization of the ideas secured from them. The operation necessarily calls attention to gaps in the pupil's knowledge, of which before he was unconscious, and furnishes him with definite objects for reading. Reading of this kind is incomparably more profitable than the perfunctory reading of ten consecutive pages, in which no one thing in particular is being sought. Most important also is the reading and criticism of the results by the teacher and the subsequent adjustment of the notes by the pupil.

The activity of the teacher during the whole laboratory period is required, both to make the work of each student successful mechanically, and to maintain the whole work on the plane of an intellectual exercise. The laboratory work to be valuable must be supervised, just as surely as it must be subsequently tested and applied in the classroom. The teacher should not be distracted from teaching by the necessity for giving out apparatus, and all arrangements for the work of the class should be made in advance.

Textbooks. — There are two distinct types of elementary textbooks in chemistry, and an analysis of their respective qualities is desirable. The first type, in which we can distinguish two subvarieties, is that of the systematic description. It resembles the university textbooks, and in many respects is not unlike the larger works of reference. The first subvariety of this kind of book places the theory in the foreground. After the briefest description of the properties of one or two gases, the pupil is led as directly as possible to Avogadro's hypothesis, in order that, through the application of this hypothesis, he may be furnished at the earliest moment and in a strictly logical fashion with the basis for the development and application of formulæ and equations. Thereafter, the systematic survey of the science is completed in the conventional manner. In the second subvariety, the study of chemical substances in a more or less conventional manner is placed in the foreground. The theory does not appear so early, is not always in strictly logical order, and is introduced at convenient intervals. In both these varieties, the arrangement is that which appeals to the mature chemist. The satisfactoriness of the performance is measured, rather by the completeness with which the whole science has been outlined, than by the appropriateness of the content or of the arrangement to the purpose of instructing immature minds.

The second type of textbook, which is quite distinct from the first, places pedagogical principles in the foreground. Such texts do not endeavor to present chemistry as a science, but attempt simply to use chemistry as a means of general education. They have the air of a laboratory manual, expanded so as to convey also a considerable amount of information. The books already referred to by McNair, and by Perkin and Lean are typical examples. Perhaps the qualities of the two distinct types of books may be shown best by contrasting certain of their features. In the former type, formulæ, equations, valence, and other paraphernalia of the science are necessarily conspicuous; from the latter variety of book they may be entirely absent: the former, since its contents are arranged to harmonize with the way in which the teacher himself was trained, can be used more or less successfully by a novice; the latter requires a more broadly trained, intelligent, and mature teacher. The former is used almost universally in the United States, the latter very frequently in Great Britain.

In point of fact, every one of the characteristics of the second, or pedagogical class of books, is an indispensable feature in all sound instruction in elementary chemistry, and should be a part of the course whether conspicuous in the actual textbook or not. These characteristics are not stated explicitly in the systematic variety of text, but are presumably to be read by the teacher between the lines. It is to be feared that the author of the systematic book presumes far too much on the intelligence and experience of the great majority of teachers, and that in most cases a book of the second class could usefully be employed, at least by the teacher, as a supplement to the one of the first class.

The elaboration of the pedagogical side will necessarily restrict the ground that can be covered in the systematic point of view, and it is appropriate to inquire how far this encroachment may be permitted. The pupil who takes chemistry in the secondary school takes it either as part of an education to be used later in teaching in the lower schools, or as part of a preparation for a college or university course, or, finally, as part of an education for business. In business, mental training and intelligence count for more than a slight knowledge of individual facts in chemistry. In teaching in the lower schools, systematic chemistry is of little use, while scientific habits of mind are invaluable as a basis for the development of pedagogical skill. Finally, the university should appreciate more highly mental training than a knowledge of a somewhat larger assemblage of facts, since chemistry is only one of a large number of studies which have an equal claim to form part of the attainments of the freshman. Without question, less mechanical acquisition of systematic chemistry and more attention to mental development would enable the chemistry of the secondary schools better to serve all of the purposes for which we may presume it is intended.

Classroom Work. — Without subsequent treatment, the results of laboratory work would remain largely incoherent and meaningless. The discussions in the classroom are largely for the purpose, first, of establishing what were the facts observed. In addition to this, they serve to recall unheeded but significant phenomena. These exercises are further useful in exercising the pupils in the language of chemistry, and correcting errors in the use of this language; in the correlation of the observed facts with the contents of the book; and in integrating the separate facts into knowledge. Amongst the special functions of the classroom work are the development of principles from isolated facts, and the rationalizing and explaining of the facts (observed and read) by the use of other facts and by the employment of hypotheses. In connection with this operation, the pupil receives some training in the conservative use of the imagination. Interest is maintained by continual references to, and applications of, everyday phenomena.

Demonstration experiments are used, in the first place, to initiate the pupils into experimental methods, and later for the purpose of showing experiments additional to those performed in the laboratory, particularly those which are too difficult for individual performance by the pupils. Written exercises are given, but not so much for the purpose of testing, as for the purpose of instruction. Single questions, susceptible of brief answer, set at the beginning of a number of meetings of the class fulfill the purpose better than a similar number of questions occupying a whole period. The pupil learns much from examination of the papers, after they have been marked and criticized by the teacher.

The Teacher. — It is unfortunate that no machinery is in existence which is devised specifically for the training of the secondary school teacher in chemistry. He usually obtains his training in the college or university, but the courses in such an institution are devised primarily for the training of the professional chemist, or rather of the mere analyst. Even if the training has been in the highest degree scientific and to the smallest extent mechanical — a condition which seldom exists — the chemical facts dealt with are limited in their range. The teacher in training should have an extensive, thorough, and eminently modern course in general chemistry. In addition, he requires, what no course in analysis ever gives, much more knowledge of the ordinary facts of the science and some acquaintance with its history. He needs also a greater knowledge of theoretical and physical chemistry obtained by reading and practical work, more ability to handle the literature of the subject, and a firmer grasp of the ramifications of the science in industry, agriculture, geology, physiology, and hygiene.

Teaching how to Study. — The student of a foreign language knows by experience something of how to study a foreign language before he begins the new course. As a rule, the student of chemistry has no idea at all how to study the science, and wastes a great amount of time without making corresponding progress. A feature of chemistry teaching which should never be omitted, therefore, is the repeated instruction of the class in regard to how to study the assigned lesson. Another feature closely related to this is that of insisting upon continual repetition of fundamental ideas and facts. In language work, a prodigious amount of repetition is inevitable, yet never too great for the purpose of thorough mastery. In science, the book usually makes each statement but once, and the repetition and interweaving at every opportunity are left to the initiative of the teacher.

Illustrations. — Another important feature is the continual reference to illustrations from practical life. Attention should frequently be called to the occurrences and uses of various chemical substances and phenomena. It is possible to teach geometry or algebra as if it were purely an artificial discipline. It is difficult to see how a subject like chemistry, with its innumerable bearings on natural occurrences, its close connection with almost all industries, and its vast commercial importance, could be treated in an equally barren fashion. Yet this marvel is too frequently realized. Similarly, correlation of the chemistry with the previous knowledge of the pupil and with all the sciences included in the curriculum is a pedagogical obligation which must be scrupulously fulfilled, especially in the secondary school.

Arithmetical Problems. — The solving of numerous arithmetical problems is an exercise too much neglected. No amount of mere explanation can confer a mastery of the meaning and use of equations that is anything like as definite or complete as that which is given by the working of such problems.

Physical Chemistry. — Many teachers inquire whether modern physical chemistry should be taught in the high school. All chemistry is studied through physical means of observation, but only those physical properties which are actually used in the laboratory can profitably be discussed in detail. While the more elaborate physical methods cannot themselves be profitably discussed, the general conclusions may often be utilized. Certainly the teacher ought to be familiar with modern views, not necessarily that he may communicate them to his pupils, but that they may influence his viewpoint and so guard him against inculcating ideas now known to be erroneous.

Qualitative Analysis. — A similar question arises in regard to qualitative analysis. In qualitative analysis a beautifully logical arrangement of certain physical and chemical facts has been devised, and the study of this system is undoubtedly educative. The facts, however, which are utilized, particularly the facts in regard to solubility and insolubility, are in themselves uninteresting and infertile. If this system, which has been devised for purely investigative and commercial purposes, has good pedagogical qualities also, a similar system should be devised for pedagogical purposes and applied to those facts of greater general importance which are alone worthy of the attention of the pupil in the elementary course.

General Features. — Among the problems which teachers of chemistry, when they meet, are prone to discuss is, What are the "essentials of elementary chemistry"? Sometimes this much-sought entity is designated the "minimum content" of an elementary course. The response to the real need which underlies this question is sought in the wrong direction. Usually a syllabus, containing the names of a number of chemical substances, the titles of several chemical laws and chemical theories, with a very few comments, is all that is offered in answer to the demand. Such a catalogue does not really answer the question at all. For example, bromine may appear in the list of elements, but the question still remains whether this item in the requirement is satisfied if the element bromine is simply named by the teacher as one of the members of the halogen family. Another teacher may feel that it is expected that this element will be studied in as much detail as is chlorine. Or, again, thermochemistry may be specified, but the writer of the syllabus may not have intended any detailed discussion of this subject, but have aimed simply to indicate that, at some stage, attention should be called to the fact that, in certain chemical actions, heat is evolved. Even when the syllabus has been expanded to the size of a textbook, as has already been done by a very large number of authors, the problem seems still to remain. Evidently the problem refers, at least in part, to something which is not contained even in the textbook, and must be sought between the lines and in the methods in which the subject is handled in the classroom. A list of topics tells little, unless we can, in some way, define the aims which are to be kept in view in the instruction and describe the viewpoint of the teacher who handles the matter outlined in the syllabus. Some attempt must, therefore, now be made to define, along these lines, the modes of handling the content.

The Aims to be Kept in View in Teaching Elementary Chemistry. — One aim, clearly, should be to utilize the previous knowledge of the pupil. A little consideration will show that a good deal is involved in this statement. We assume that the pupil as he comes to us has thoroughly mastered arithmetic and can employ it without further instruction. We assume that, in the study of mathematics, language, and history, he has learned to look for the main facts by the processes of observation, repetition, and comparison. We are convinced that the pupil has learned to avoid speculation. We assume that he knows how principles or laws are formulated, and how laws and hypotheses are to be used. It is true that these terms may not have been employed in the study of language, but the conceptions and processes underlying them, we judge, must be thoroughly familiar. In other words, we assume the pupil's familiarity with scientific method.

In addition to this, in many instances we have a right to assume that the pupil has studied physics and knows a good deal about the science. Too often, however, we assume still further that he will be able spontaneously to apply his arithmetic, his knowledge of scientific method, and his acquisitions in physics to the study of chemistry. It is only gradually that we realize that the habits of mind we are assuming, if they exist, are permanently attached to the subject in connection with which they were acquired, and that as a matter of fact there is not the slightest tendency to apply them to the new subject. The ability to take an idea from its accustomed surroundings and apply it in an entirely new relation is, after all, one of the characteristics of genius, and to assume that the high school pupil will exhibit any such characteristic, in however small a degree, is undoubtedly assuming too much. The teacher of chemistry must do practically the whole of this work over again. The scientific method, as it may exist loosely in the mind of the pupil when he is studying language or history, must be developed, crystallized, and used, until its conscious application in chemistry becomes spontaneous. The study of chemical phenomena, by noting particular occurrences and interpreting them in accordance with physical principles, must be carried out almost with the same care that would be necessary if physics never had been studied before. It must be remembered that many of the parts of physics used in chemistry receive little attention in the course on physics and are in themselves difficult — the ideas in connection, for example, with vaporization and condensation. The conceptions by means of which we distinguish between the decomposition of a molten substance and mere boiling are not acquired in elementary physics. Then, too, the physics used in chemistry is not presented in the same logical way as in the textbook on physics. The phenomena turn up unexpectedly, and have to be identified before they can be understood. A fairly complete mastery of physics has gradually to be acquired *during* the work in chemistry, if this work is to be of an intelligent description. Chemical phenomena talk to the observer in the language of physics, and a colloquial knowledge of this language, such as the graduate from the course in physics cannot be expected to have, is indispensable in chemical observation. Even arithmetic, especially the rule of proportion, has deliberately to be taught in the class in chemistry, because, although the pupils are familiar with its application to common objects, they are completely nonplussed when asked to apply it to chemical substances. A very large proportion, therefore, of the true content of the course in chemistry consists in studying arithmetic, physics, and the scientific method, in their application to chemistry.

In addition to this, we have the more strictly chemical part of the course. This involves, among others, the following items: (1) The technique of apparatus and experimentation. (2) The chemical facts, which must be neither too many nor too few, and should include, as far as possible, familiar materials, familiar processes, and familiar phenomena. (3) The construction and reinterpretation of generalizations, which sum up the facts and make them memorable and significant. (4) The hypotheses, and their use in explaining the facts and laws of the science and in furnishing an interpretation of chemical behavior. (5) The application to daily experience, to common substances, and to commercial processes and products, of all that is learned, to the end that interest may always be awakened and maintained.

By way of limitation, the course is not to be distorted, or in any way affected, by college preparatory ideals. Most emphatically, the course has no relation to preparation for the study of medicine or engineering — it is not pre-professional. Its sole object is preparation for life.

The test of success in following such an outline is not what particular facts or how many facts have been acquired, nor whether the laws can be recited with accuracy or the theories expounded, but whether the pupil acquires any ability to think chemically. Can he, in however small a way and within whatever narrow limits, employ his knowledge in a rational fashion? After studying the necessary facts, could he suggest a method of separating a mixture of hydrogen and carbon dioxide, or of hydrogen and ammonia, or would he be inclined to say that he could not find the answer in the book?

This sketch is an ideal. It is not a goal to be reached, but only an aim to be kept in view; a direction in which to strive; a set of guideposts suggesting the better way; a series of touchstones for testing the appropriateness of every word, printed or spoken, with which the pupil comes in contact during his year of chemistry.

The program outlined is far from light, and carrying it out may limit the ground covered, as measured by the number of facts of systematic chemistry which can be included; but it emphasizes the fundamental things. Whatever else is omitted, we must not omit those things which alone make the study of chemistry a rational exercise. The study of chemical phenomena as consisting chiefly in the interpretation of physical observations is fundamental; and, in cutting our course to fit the time, we can no more reduce, with reason, the attention given to physics than, in building a house, we can save expense by leaving out the foundation.

The Viewpoint. — The whole effect of the instruction may be destroyed if it is presented from a faulty viewpoint. The most important characteristic of the viewpoint is that it should be experimental. The experimental chemical difference between oxygen and ozone is not that the formula of the one is O_2, and of the other O_3, but that the latter is more active, and oxidizes silver, for example, while the former does not. The experimental reason for writing the formula of hydrogen H_2 is not that there are two atoms in this molecule, but that a given volume of hydrogen contains twice as much of the element as does an equal volume of hydrogen chloride. The current statements of definitions and laws are usually mixed — some theoretical and others experimental. All the laws or definitions that are given should be based on experimental facts and should be finally stated in experimental terms. Valency, for example, is an experimental fact, and not the theoretical matter that the common definition would lead us to suppose.

Another characteristic of the viewpoint is that it should be rational, rather than dogmatic. For example, when simply told that matter is a combination of atoms which join to form molecules, we naturally suppose that this fact will explain all the circumstances connected with combination and we may state dogmatically in each particular instance that it does so. When, however, we learn that the atomic theory was suggested originally by Dalton to explain the independent behavior of gases when mixed, and was later applied to account for the fact that each chemical element uses an individual combining weight, by which the proportions of it in all forms of combination can be accurately expressed, and that until recently little more than this amount of use could logically be made of the atomic theory in inorganic chemistry, we see at once that there are many things in explaining which this theory may not be used. It does not profess to explain the tendency to combine (affinity), or the way in which the substances cohere when combined, or the new properties of the compound formed, or, in fact, anything excepting only the quantities of each kind of matter involved in the change. The hypothesis, then, has no experimental application in chemistry until combining proportions are discussed, and sheds no light on any facts other than those of combining proportions. Recent discoveries, indeed, show, or come very near to showing, that matter is really composed of atoms and molecules (see Professor Rutherford's address); but, unless the opening lessons could deal with the experimental study of radioactive substances, there would be no logical way of introducing atoms and molecules at this stage.

We may summarize our conclusions under the head of the viewpoint as follows: (1) Observation should be shown consistently to be the sole source of all facts; none being obtained by speculation, by the interpretation of laws, or otherwise. (2) Experimental, literal terms are to be used in stating all facts. (3) Hypotheses are to be used only in explaining and relating facts, and are to be eliminated from the final statement.

Needless to say, the point of view is not something to be explained to the pupil, but something that is to be used by the teacher. To study our own viewpoint and correct it is a difficult matter, for we are not even conscious that we have a viewpoint until it suddenly shifts in some important particular. The teacher must gradually realize and adjust his own viewpoint. The viewpoint is something not obtainable directly from books, for it is there contained implicitly, and not explicitly. In its details it is an individual possession of each chemist. We can observe its importance best by imagining the viewpoint to be entirely removed. A course in chemistry absolutely without a viewpoint would evidently be a wholly uninstructive chaos.

The Aims of University Elementary Chemistry. — Although in the United States the aims of the high school and university courses are almost identical, this is due, in all probability, not so much to the unanimous and conscious decision that the courses should be identical, as to the fact that the teachers are trained in the university and teach most easily what they themselves were taught. In theory, the two courses might be different. The nature of the secondary school course should depend solely on pedagogical, practical considerations; the nature of the university course is largely predetermined by the fact that many of the graduates of the university become teachers of chemistry or go into medicine or engineering. In either of those three cases the elementary course is followed, either by more advanced courses in chemistry, or by courses in physiology, physiological chemistry, geology, and other sciences, or by uniting of both kinds, in all of which it will be assumed that the student has a knowledge of chemistry of the conventional description. A course which has for its main purpose mental training will not suffice to fit the student for the study of physiology or analysis. The university course is therefore a pre-professional course. The university course involves education *in* chemistry, while the purpose of the high school course has been simply education *through* chemistry. The high school course may be admirable without being conventional. The university course has no such option.

One of the most pressing unsettled problems is the proper articulation of high school with college chemistry. The pupil who has studied chemistry in the secondary school — where should he be placed if he continues the study in the university? He is not prepared to take up analysis until after he receives further instruction in general chemistry, given in a modern way. It is certainly unjust to the instructor in the university, to the pupil himself, and to the previous instructor, to put the pupil in the same class with beginners Only two solutions are possible: one is to give in the university an exact equivalent of the high school course, followed by a supplementary course in preparation for more advanced work. The other is to have two distinct courses, one for beginners and the other open to those who have studied the science for a year in the high school. Both of these methods are in successful operation in the few institutions in which they have been tried.

More Advanced Courses in Chemistry. — The subdivision of the science of chemistry for the purpose of instruction is tolerably uniform in all institutions. Elementary general chemistry is followed by qualitative and then by quantitative analysis. As taught in the modern way, these courses do not deal simply with routine methods, which might almost as successfully be imparted to a youth without previous education. They aim to develop the pupil's knowledge of the science in the broader sense, and to prepare him, not for the routine work of the analyst, but for intelligent work in scientific chemistry, industrial chemistry, or chemical engineering.

The compounds of carbon, on account of their number and rather unusual modes of behavior, are generally taught in a separate course known as organic chemistry. The special physical methods which have recently been introduced for the ascertainment of facts and for the elucidation of chemical phenomena are practiced, and their applications are described, in special courses in physical chemistry. Finally, in certain instances an attempt has been made to realize in the laboratory to some extent the conditions of manufacturing chemistry. In such a course, the pupil handles larger masses of material, considers the cost of the original substances, the expense of each operation, and the yield. He considers also the purposes for which the product is employed in commerce, and tests its quality by quantitative methods in order to learn from practical experience what kind and amount of impurities are permissible in each instance. A course of this kind is not in any sense a substitute for practical experience in a chemical industry, but may plausibly be supposed to diminish the awkwardness of the man of academic training when he suddenly assumes the position of chemist in a factory. A. S.

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CHESTERFIELD, LORD. — Philip Dormer Stanhope, fourth Earl of Chesterfield, was born in London, Sept. 22, 1694. Neglected by his father, the third Earl, he was educated under the direction of his maternal grandmother, the Marchioness of Halifax. He had mastered French at 18 with the aid of a foreign tutor, and in 1714 he left Cambridge after a year's stay, convinced that "the classics contained everything that was either necessary, useful, or ornamental to men." He was soon disabused of this notion by a tour in Flanders, where he was introduced to the best society, and learned the arts of the polite world. Recalled to England at the death of Queen Anne, he was appointed in 1715 gentleman of the bedchamber to the Prince of Wales. In the same year he made his first speech in the House of Commons. For some years his political activity was restricted by the friction between the Prince and the King. He employed his leisure pretty gayly in company with the best wits of the day, made friends of Addison, Pope, Arbuthnot, and Swift, and judiciously courted the Prince's mistress. On his father's death in 1726 he took his seat in the House of Lords, and soon after the accession of George II he was appointed ambassador at The Hague. During this period he formed a gallant alliance with a Mlle. du Bouchet, who in 1732 presented him with a natural son. In 1733, for the sake of money and influence, he married Melusina von der Schulenburg, natural daughter of George I. In the House of Lords he distinguished himself by a brilliant opposition to the government of Sir Robert Walpole, and his part was considerable in the downfall of that minister in 1742. Aside from his various important diplomatic missions, his most conspicuous political services were performed as Viceroy in Ireland in 1745, and as Secretary of State from 1746 to 1748. He resigned in 1748, and to his death in 1773 remained in practical retirement from public life. Deafness drove him more and more upon his own resources. He spent his last 25 years largely in reading and writing and in attending to the education of his natural son and his godson, who inherited his title.

The principal materials for the study of his ideas on education are: the letters to his son, first published in 1774 by the son's widow; the letters to his godson, of which the first complete edition appeared in 1890; and the letters to the father of his godson, A. C. Stanhope, which were published in 1817. It should be constantly borne in mind that none of these letters were intended to reach the public.

As an educator, Chesterfield is not a prophet, but a representative; his importance consists in the fullness and precision with which he expresses the Gallicized classicism of the eighteenth century. Lord, linguist, diplomat, man of letters, man of fashion, acquainted with the most eminent Englishmen and Frenchmen of three generations, he was perhaps as adequately qualified to formulate the educational ideal of the age as Reynolds to formulate its ideals in art, Johnson in literature, or Burke in politics. Every one agrees that he embraced some of the vices of his time; it is still necessary to insist that he also embraced most of its virtues. The popular conception of him as merely the master of an exigent etiquette and a licentious heart — the morals of a courtesan and the manners of a dancing master — ridiculously distorts the facts. He has been fiercely attacked for his dissimulation; he has suffered chiefly for his candor. Furthermore, his use of the pedagogical art of varied repetition, his habit of attending to but one thing at a time, and his power of making the matter in hand seem for the moment paramount, lay him open to the caricaturist. He advocates the cultivation of the graces with such reiterated emphasis that one temporarily forgets how frequently and emphatically he pleads for wisdom and virtue. When he urges attention to the classics, he seems to be all for the ancients; when he sets forth the claims of living literature and languages, he seems to be all for the moderns. For a dozen years he cries, "*Approfondissez;* go to the bottom of things"; when his son visits Paris, he declares that external finish is everything. The exaggeration is pedagogical, timed to the boy's development, carefully adjusted to his particular needs, and confusing or inconsistent only to the inattentive. In his minute regard for detail, Chesterfield himself never loses sight of *le tout ensemble.* One may dip into the letters here and there, and conclude with Walpole and Johnson that this great man was but a maker of *bons mots*, a profligate lord among wits; but no person of intelligence can read them through without being impressed by the comprehensiveness, the passionate unity, mass, and coherence of the writer's thought. He has, indeed, as he often declares, attempted to give his son the best education of any man in England. He has this vast superiority over many subsequent educators, that he knows exactly what he wants. His is not the rôle of a Plato or a Rousseau; he has no germinating or visionary ideas, no revolutionary dreams. Like the majority of his great English contemporaries, he accepts the universe — that is to say, polite London — and makes the most of it. His educational ideal is not an experimental theory; it is entirely what he regards as the best practice of his time reduced to principles and corrected by the experience of a master of the arts of life.

Chesterfield's system, as distinguished from that of Rousseau and his followers, rests upon an unshaken belief in civilization and a profound distrust of undisciplined human nature. His primary concern is the translation of man to gentleman. From La Bruyère, Pascal, and La Rochefoucauld, from intercourse with society, from looking keenly into his own heart, he has come to believe that natural man is a vain, vicious, and self-interested animal. Hence, he is no individualist. Such maxims as "Be natural," "Trust thyself," "To thine own self be true," epitomize a doctrine antipodal to his. For him not the individual man but the most cultivated society is the measure of all things. If he urges conformity, it is not from hypocritical servility; it is from real humility, genuine faith in the usages established by the majority of the well bred. Hence the first step in moral education is the repression of egotism, passion, instinctive impulses. The burden of his counsel of dissimulation is this: Never talk of yourself; do not give way to fits of temper; suppress feelings of boredom, superiority, and personal antipathy. In short, keep within door those vices which every man ought, so far as is possible, to extirpate. If, on the other hand, he makes little direct attempt to cultivate the heart, it is perhaps because he unconsciously anticipates the modern theory of the emotions — make the right motions and the emotions will be right, or will tend to be right. At any rate, Chesterfield is certain that the external behavior is within the control of the reasonable will; it is no part of his scheme to recommend the impossible, and he may devote himself to behavior because he believes with Arnold that conduct is the controllable three fourths of life. Indirectly, he does provide for the cultivation of the heart through imitation of models. With indefatigable pains he points out those whom he regards as the masters of manners and morals, and entreats his pupil to sit at their feet; to be true not to the whim of the moment, but to the experience of the best men of his own and ancient times; to live as ever in the sight of Aristotle, Cicero, Horace, Molière, Racine, Addison, Swift, and Bolingbroke. So far as he understands the classical spirit, he aspires to be classical. The entire tendency of his mind is toward a rational but almost impassioned conservation of those things which mark man's progress from rusticity, barbarism, and animalism to urbanity, civility, and the life of reason.

He determines the content of education with strict regard to its immediate objects, namely, to prepare a man to move with ease in good society, and to participate with success in public life. Hence an apparent paradox: its substance is that of a very liberal culture, while its spirit seems intensely utilitarian. It aims to provide for the whole nature of man as a moral, intellectual, political, and social being; but it subordinates the search for truth to the pursuit of culture, and culture in turn to success. The external measures of success are: the power to please, dependent on personal charm; the power to exact esteem, dependent on character; the power to excite admiration, dependent on abilities. Though friendly to pleasure, Chesterfield is too thoroughly ambitious to propose pleasure as the ultimate end. But though femininely sensitive to opinion and greedy for applause, he, at least, despises the world too much to find the ultimate sanction of effort in political or social power. The solution of the paradox is this: his internal measure of success is full self-realization under the laws imposed by reason, and the consent of the well bred. He approaches the notion of art for art's sake; it is not life that he loves, but the art of life, the mastery of its technique. In the main features, his plan was molded on his own career, though he has much in common with the ideas of Locke, and, indeed, with the aristocratic training of two hundred years.

His utterances on religion, perhaps more than on any other topic, were influenced by the Age of Reason. To his godson he avows belief in conscience and in God as the supreme being; he significantly cites Voltaire in support of the mercy and justice of God; on subsidiary points he is not much more or less explicit than Locke. To his son he commends the observance of religious forms as due to society, and a tentative faith in religion as collateral security. He is doubtful whether philosophers should permit themselves to shake the social edifice by open declaration of skepticism; and he expresses unequivocal detestation for professed atheists. His son's religious training, however, he entrusts to a clergyman, for he is invincibly opposed to giving instruction except upon positive knowledge. His deeper conviction on this matter may be suggested by the following sentence: "Seneca says, very prettily, that one should ask nothing of God, but what one should be willing that men should know; nor of men, but what one should be willing that God should know; I advise you to say or do nothing at Paris, but what you would be willing that I should know." In other words, Chesterfield undertakes to be the voice of good society, which for him is the supreme authority, if not the Vicar of God.

On moral questions he speaks forcibly, explicitly, and for the most part — contrary to popular opinion — soundly. "For God's sake," he exclaims, "be scrupulously jealous of the purity of your moral character; keep it immaculate, unblemished, unsullied." In the society which he represents, the cardinal points of moral character are justice, benevolence, trustworthiness, veracity, temperance, and self-control; on these points he is inflexible. His duly execrated attitude toward sexual morality he does not himself attempt wholly to justify; he maintains merely that decently conducted liaisons do not in his world damage a man's reputation; and from his own experience he believes that they may be extremely useful. In this opinion it needs to be said that he is not an innovator; he is an eighteenth-century inheritor of an ancient aristocratic tradition of which physical chastity was not a part. The licenses of the aristocratic code were veiled in the sixteenth century under the name of chivalry, and in the seventeenth century under the name of gallantry; in the eighteenth century, they became cynical and, therefore, shocking. But it was rather the spirit than the facts that had changed. Opprobrium attaches to Chesterfield's code, not so much because it permits as because it tries to rationalize, restrict, and utilize vice; so far he would extend the sway of reason.

In planning his course of studies, Chesterfield contemplates a pupil who is to be both a scholar and a gentleman. Ancient and modern languages, history and geography, philosophy, logic, and rhetoric he considers absolutely fundamental. Nor is he content with a smattering of these subjects. Latin, he declares, it is only a shame not to know perfectly, for every one knows Latin. But for his son he also insists upon Greek from the outset to the finishing of his education in Paris, "for to know Greek well is to be really learned." Italian, French, and German — then little known in England — his son must speak, read, and write like a native. Yet he cannot approve the "natural" method of learning languages without grammar advocated by Locke; and in general he is more austere than Locke in insisting upon solid acquisition as well as discipline. History is to be studied with especial diligence, and the future diplomat must become perfectly familiar with the constitution, and the civil and military state, of every country in Europe. Command of a polished English style both in writing and in speaking must be acquired at all costs; the means are the imitation of models, translating classics, and constant practice. Upon mathematics and "jimcrack natural history," Chesterfield lays light stress; yet he would not have a gentleman wholly ignorant of any possible topic of conversation. At the same time, the range of his curriculum precludes eccentricity and antiquarianism. "Let blockheads read what blockheads wrote"; "Stick to the best established books in every language." Even in travel there is danger of becoming a mere frivolous virtuoso; to travel with profit one should consider a country "classically and politically." Knowledge of the world is of equal importance with knowledge of books; the educator's task is not ended till he has shown his charge the value of going much into fashionable society, and has directed his course through the principal courts of Europe. Not for the foundation, but for the finishing touches, Chesterfield prescribes courtship, fencing, and the dancing master.

It is in every one's mouth that he recommends sacrificing to the graces; the subtlety of his intentions, however, exposes him to misrepresentation. The grace that he worships is in the last analysis no external accomplishment; it is a pervading spirit entering into and controlling every activity of mind and body. It is a vital sense of decorum operating not merely in manners, but also in morals, in religion, in studies, in the whole conduct of life. It is not grace in the abstract, but grace in action that Chesterfield adores — *suaviter in modo, fortiter in re.* Seldom has attention been called to his unflagging incitement to strenuous living; though rarer than either grace or energy is the union of the two. Of noble rank — he refused a dukedom — and immensely wealthy, he consistently ignores every honor not won by merit. The distinctive quality of his educational ideal is the more than traditional ardor with which it fuses solid classical and modern learning with French *politesse* — the purpose which underlay the founding of the French Academy. He abhors equally the uncouth pedant and the empty man of fashion; but he hopes by pouring the virtues of both into one mold to produce *l'homme universel.*

Chesterfield's *Letters to his Son* were first published in two volumes, 1774. In 1800 the eleventh English edition appeared in four volumes. There was a French translation in 1775, a German translation in 1774–1776, and an American edition in 1779. The letters to A. C. Stanhope were published in 1817. The *Miscellaneous Works* were published in 1777, two volumes with an important memoir by Maty; in 1778 a third volume of tracts, letters, and poems was added; in 1779 a second edition in four volumes came out with an appendix containing sixteen characters. Innumerable selections, adaptations, parodies, and burlesques have appeared in many languages. Most of the popular editions on the market are very much abridged. Contemporary comment on Chesterfield may be found widely scattered through eighteenth-century letters; see the memoirs and letters of Lord Hervey and Horace Walpole, Colley Cibber's *Apology,* Boswell's *Life of Johnson.* S. P. S.

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CHEVY CHASE COLLEGE AND SEMINARY, WASHINGTON, D.C. — A proprietary resident school for girls and young ladies. Academic, collegiate, fine and domestic arts departments are maintained. Admission requirements are not definite. There is a faculty of 18 instructors.

CHICAGO, CITY OF. — The largest city in the state of Illinois, the second largest in the United States, and the chief commercial city in the North Central states. Organized as a town in 1833, and incorporated as a city in 1837, the city has had a wonderful growth. In 1900 its total population was 1,698, 575, and its estimated population in 1909 was 2,224,491. Its school census, 6–21 years of age, was 517,224 in 1909, and its total school enrollment was 296,427 in day schools and 24,520 in night schools. The enrollment in private and parochial schools was 100,862 additional. Of the total population of 1900, 35 per cent were foreign born, and 2 per cent were of the colored race. Among the foreign born every race is represented, the largest percentages of the total foreign born of 1900, being 31 per cent Germans, 13 per cent Irish, 12 per cent Scandinavian, 10 per cent Poles, 10 per cent English and English Canadians, 6 per cent Bohemians, 4 per cent Russians, and 3 per cent Dutch.

History. — An agent of the fur company opened the first school at Ft. Dearborn for the seven or eight children there in 1816. Records show that private schools were in existence there in 1820 and in 1829. In 1830 the first school, not originating with the parents of the children, was opened. In 1831 Cook County was organized and a commissioner of school lands was appointed, and in 1832 he employed a teacher for a school on the north side of the river. A number of private schools, one of which was for girls, were opened in this year. In 1833, on the incorporation of the town, the less than 100 voters petitioned for the sale of the school lands, and, with the income from the money derived from the sale of all but four blocks of the school section ($36,619.47), grants were made to private teachers, who in turn certified attendance in the proper manner. This form of subsidized private schools continued until 1844.

In 1835 the legislature passed a special law for Chicago, which established what was in effect a modified form of the New England district system. The voters were to elect 5 or 7 inspectors, who were to examine teachers, select textbooks, and visit schools. Each city district was also to elect annually a district board of 3 trustees, who employed the teachers for the district, saw that a sufficient number of free schools was maintained, and levied district taxes for all expenses except teachers' salaries. The voters were to fix the salaries of the teachers, and vote taxes to pay the same. Two years later, on the incorporation of the city, the control of the schools was given to the City Council, and the immediate management was vested in inspectors, appointed by the Council, and having the same powers as under the 1835 law. Each district still elected district trustees to employ teachers, levy taxes, and provide buildings. There were now 5 school districts and 828 census children. Taxes were not popular, and the income from the school fund formed the chief support of the schools. The first city schoolhouse was not built until 1845.

By the close of 1853 the school enrollment had increased to 3086, with 34 teachers employed in 7 schools. The schools were ungraded and practically independent in methods, textbooks, and plan. Though the inspectors had adopted five textbooks for use in the schools in 1840, the report of 1854 would indicate that no uniform usage existed even at that time. The schools were insufficient in numbers, as schools were only opened when the demand was strong enough to ensure taxes being voted, and the district system stood in the way of progress. In 1853 the schools were so crowded that a thousand children had to be turned away because of lack of seats, and the continued rapid growth of the city has kept the schools in this condition almost continually ever since. To secure some relief a coeducational high school was organized in 1856–1857, and in 1858 the minimum age for admission to the schools was raised to 6 years. By 1870, 557 teachers were employed, as against 123 in 1860, 21 in 1850, and 9 in 1845. The great fire of 1871 destroyed 15 school buildings, threw 135 teachers out of work, and seriously crippled the work of the schools through the inability of the city to collect taxes. In 1875 there were 10,000 children on half time, and many buildings wholly unfit for school use were rented in an effort to provide school accommodations to meet the needs of the rapidly growing city. By 1885, 1296 teachers were employed, as against 557 in 1870. Outlying territory was annexed during the late eighties, and in 1890 the number of teachers had risen to 3001, and still 15,773 children were in half-time schools because of the lack of school facilities. In 1900, 5806 teachers were employed, 363 rented schoolrooms were in use, and 16,092 children were in half-time schools. In 1905 the conditions were but slightly improved. Though the school department has erected many excellent modern buildings every year, it has been unable to provide buildings fast enough to keep up with the growth of the city. All buildings built within the past twenty years have been the best of their class, most of them being provided with assembly rooms, baths, gymnasiums, and manual training and cooking rooms.

In 1851 the Council appointed an agent to look after the school lands remaining, and took a step in the direction of centralization by depriving the district trustees of the right to hire teachers, transferring this function to the central Board of Inspectors. In 1853 a still more important step was taken by the creation of the office of City Superintendent of Schools, and one of the duties given to this new official was that of introducing order and unity into the work of the schools. The new Superintendent at once graded the schools and established uniform records, and in 1856 he established public oral examinations for candidates for admission to the high schools. These awakened great interest in the work of the schools. In 1861 a graded course of study — the first in Illinois — was introduced, the work of both grammar and primary schools being divided into 5 grades. Evening high school classes were formed in 1868. In 1871 an independent normal school was created. In 1875 the Board took over a private school for the deaf, opened in 1870, and made it a part of the city system.

In 1857 the legislature granted Chicago a new charter, which did away with the district organization and district boards, retained the inspectors, increased their number to 15, changed them into a centralized Board of Education, and gave them full control of the schools. The Council still elected the Board members and controlled the school property. The revised charter of 1863 contained still more detailed provisions for the management of the schools of the city, with much emphasis on the financial side of the administration of the schools. In 1872, following a new state constitution, a new legislative act provided that in cities of 100,000 or over the School Board should consist of 15 members, one third going out of office each year; that they should be appointed by the Mayor with the approval of the Council; definitely transferred all school property from the control of the Council to that of the School Board; and gave the Board power to buy sites, build, and secure loans with the approval of the Council. In 1879 a city school tax of 5 per cent, three fifths for buildings and sites, was authorized by the legislature.

In 1874 the first laboratory for the study of science was provided at the high school, and in

1890 laboratories were provided for all of the high schools. In 1875 the schools were regraded and organized into 8 grades instead of 10; schools for the deaf were established; and the reading of the Scriptures, which had been practiced since 1841, was prohibited. Woodworking was introduced into the North Division High School in 1886; in 1890 the English and Manual Training High School was organized; and in 1891 manual training was introduced into the grammar schools. In 1892 the Board adopted a number of private kindergartens, and made them a part of the public school system, and since then kindergartens have been established in all parts of the city. In 1899 the first truant officers were appointed. The Board also established the Waifs' Mission School in 1891, and the Bridewell School in 1894. In 1893 the city normal school, which had practically ceased to exist in 1877, was revived, and in 1895–1896 the Cook County Normal School was taken over by the city, made a part of the city school system, and substituted for the city normal school. In 1892 teachers were elected on indefinite tenure for the first time. A city teachers' pension fund was authorized in 1895. In 1895 a school for crippled children was established, medical inspection was begun, and a department of child study organized. In 1900 the legislature ordered Chicago to establish a parental school, and established juvenile courts. In 1903 the first aid was extended to the vacation schools, which had been maintained by private means for a number of years. In 1905 promotional examinations for teachers were established.

The history of the development of the Chicago schools up to about 1900 clearly indicates an impersonal development. Circumstances, rather than careful planning, have determined what has been done. Unbusinesslike methods have characterized the work of both the Council and the Board of Education. In 1906 the president of the Board of Education devoted a good portion of his annual report to an arraignment of the unbusinesslike methods of the school system. An absence of any far-reaching policy is evident. Only since about 1900 has order, system, and policy begun to direct affairs. An effort was made, in 1898, to provide Chicago with a thoroughly modern business organization through the work of the Chicago Educational Commission (*q.v.*), but the movement failed. With the election of Mr. Cooley as Superintendent of Schools in 1900 increased power was given to the superintendent in handling the educational department, and many important changes and reforms were introduced, though against serious opposition. Business reforms were also introduced, and the management of the school system was placed on a much better business basis than had been the case before.

Present System. — The schools of the city are governed under the general laws of the state of Illinois, as special legislation is forbidden. The general state school law and the law applicable to all cities of over 100,000 inhabitants (Chicago is the only city in the state of this size) form the governing law for the city, except such additional provisions as are contained in the city charter with reference to the size of the Board of Education, manner of appointment, etc. The Board of Education consists of 21 members, appointed by the Mayor, with the consent of the Council, from the city at large. The term of office is 3 years, one third going out of office each year. This body has control of the schools of the city, except that the concurrence of the City Council is necessary if the Board desires to erect or purchase buildings; sell, buy, or lease school sites; issue bonds for buildings or sites; or borrow money for school purposes. The Council also levies the annual tax for schools, but the amount is fixed by the Board of Education, and is not subject to reduction by the council, if within the legal limit of 5 mills.

The Board of Education elects all of its executive officers. On the business side there is a Secretary, who attends to all of the clerical business of the Board; a Business Manager, who looks after all contracts, leases, and collections, and has charge of the financial side of the work; a Superintendent of Supplies, who has charge of the purchase and distribution of school supplies of all kinds; an Auditor, who audits all bills, and prepares a statement of accounts; a School Architect, who prepares all plans for new buildings and additions, and who supervises all construction and repair work; and a Chief Engineer, who has charge of the installation and upkeep of all heating and ventilating apparatus, and who acts as a supervisor of engineers and janitors.

On the educational side the Board elects a Superintendent of Schools, for one-year terms, who has charge of the educational department, and who is given the initiative in the appointment, promotion, and transfer of teachers. The Superintendent is assisted by 2 Assistant Superintendents and 6 District Superintendents; a Superintendent of Compulsory Education; a Superintendent of the Parental School; a Director of Scientific Pedagogy and Child Study; and special supervisors of physical culture, manual training, and household arts, and schools for the blind.

The school system consisted, in 1908–1909, of 1 normal school, organized as a Teachers' College for the city; 19 high schools, with a large commercial high school under way; and 244 elementary schools. Included in the above were a large and well-equipped parental school; a house of correction; a school for crippled children, 11 schools for the deaf, 3 schools for the blind; 61 cooking centers; 147 manual training centers; and a large number of kindergartens, 262 kindergarten teachers having been employed. A total of 281 supervisory officers and 6015 regular teachers were employed in day schools, and 732 additional teachers in evening schools during 1908–1909. The total current expense for maintenance only was $8,517,239 in the same year. Of this amount, $339,144 came from state sources; $581,466 from the income from permanent funds, the principal of which amounted to $1,263,190, in June, 1908; and the remainder was raised by local taxation. E. P. C.

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CHICAGO COLLEGE OF DENTAL SURGERY, CHICAGO, ILL. — See Valparaiso University.

CHICAGO EDUCATIONAL COMMISSION. — This was a special commission, authorized by the City Council of Chicago in December, 1897, on the recommendation of the Mayor; appointed by the Mayor and confirmed by Council in January, 1898; and approved by the Board of Education of Chicago in May, 1898. The Chairman was William Rainey Harper, the President of the University of Chicago. Professor George F. James, now Professor of Education in the University of Minnesota, was elected Secretary and compiled the report. The Committee consisted of eleven members, three of whom were members of the Council; two were members of the Board of Education; and two had formerly been members of that body. The opinions of all interested bodies and persons were sought, both in and outside of Chicago. After five months of work, with weekly meetings, the Committee met continuously for a week, and then drew up, and had printed, a preliminary report. This was circulated within and without the city and criticism was sought. Continuous sessions were held for a time again in November and in December, and finally a detailed printed report was made to the Mayor and Council in December, 1899. This report was widely circulated, and was welcomed generally throughout the United States as the most complete and able exposition of proper school management for a large city that had appeared in print up to that time. The Committee also submitted, with the report, a draft of a proposed law to carry the recommendations into effect. The report awakened much discussion, both favorable and unfavorable, in the city of Chicago, but the recommendations of the Committee were never carried into effect.

The report was afterwards reprinted by the University of Chicago Press, and has been extensively used as a text in college classes in City School Administration. It is a Report of 248 + xvi large 8vo pages. The nature of the report may be seen from the Table of Contents, which is as follows: —

I. The Organization of the Board of Education.
II. The Business Management of the Board of Education.
III. The System of School Supervision.
IV. The Examination, the Appointment, and the Promotion of Teachers.
V. The Elementary Schools.
VI. The High Schools.
VII. The Normal School.
VIII. Special Studies.
IX. Resident Commissioners.
X. Text Books.
XI. The Evening Schools and a Free Lecture System.
XII. Vacation Schools and School Playgrounds.
XIII. Ungraded Rooms and Schools.
XIV. The Compulsory Attendance Law and a Parental School.
XV. Teachers' Institutes and a Teachers' Library.
XVI. School Faculties and Councils.
XVII. The School Census.
XVIII. School Accommodations.
XIX. Training for Citizenship.
XX. School Buildings and Architecture.

The above constitutes three fourths of the report, and the remaining one fourth consists of 12 Appendices containing documents and information supplementary to the above chapters.

E. P. C.

Reference: —

Report of the Educational Commission of the City of Chicago. (Chicago, 1899.)

CHICAGO-KENT COLLEGE OF LAW, CHICAGO, ILL. — An amalgamation of the Chicago and Kent colleges of law, made in 1900. Courses are offered in the evenings, and extend over three years. Candidates for a degree must furnish evidence of a high school education or its equivalent for admission; other candidates are admitted, provided they have sufficient education to follow the courses. The undergraduate course leads to the degree of Bachelor of Laws. A four years' graduate course is also maintained. There is a faculty of 16 professors and 15 lecturers.

CHICAGO THEOLOGICAL SEMINARY, CHICAGO, ILL. — A theological college organized in 1854 and offering a three years' course to students of all denominations who have had a collegiate or equivalent education. In addition to the purely professional work, courses are offered in principles and methods of religious instruction, Sunday school work, and social economics. The Chicago Commons, an important social settlement, affords a field for sociological investigations and practical work by the students of the seminary. A school of church music is also maintained in connection with the seminary to afford a musical preparation for musical directors, organists, church singers, pastors' musical assistants, and theological students. Ozora Stearns Davis, Ph.D., D.D., is the president.

CHICAGO, THE UNIVERSITY OF. — **Historical Outline.** — An institution known as Chicago University, founded under Baptist auspices in 1857, surrendered its charter in 1886. Within two years a group of men began to plan for a new college. The American Baptist Education Society interested Mr. John D. Rockefeller, who in 1889 offered $600,000 on condition that $400,000 be raised by June 1, 1890, — a requirement which was promptly met. In planning for the new institution Mr. Rockefeller and the officers of the Baptist Education Society consulted Dr. William Rainey Harper, Professor of Semitic Languages at Yale University. It was due chiefly to Dr. Harper that the original plans for a college were widened to include the founding of a genuine university. On Sept. 10, 1890, the university was incorporated with a Board of Trustees which included a number of Chicago's most prominent citizens. The charter provides that the President and two thirds of the trustees must be members of Baptist churches, but it also explicitly declares that no theological test of any kind shall be applied either to members of the teaching staff or to persons who seek admission as students. It also asserts that women shall be admitted to all departments on equal terms with men. William Rainey Harper was elected the first President of the University of Chicago and entered on his duties July 1, 1891. Further gifts from Mr. Rockefeller followed at frequent intervals. At the same time citizens of Chicago began to give generously for land, buildings, and equipment. In 1892 the Baptist Union Theological Seminary, which held property in the suburb of Morgan Park, was moved to the university grounds and became the Divinity School of the university. In 1898 University College was established, and for 6 years was largely supported by the gifts of Mrs. Emmons Blaine. It was planned primarily to benefit the teachers of Chicago by providing courses of instruction in the center of the city. In 1901 the Chicago Institute, founded by Mrs. Blaine and presided over by Colonel Francis W. Parker (*q.v.*), was combined with the University Laboratory School, established by Professor John Dewey, the South Side Academy, and the Chicago Manual Training School into a School of Education with a practice school system which included kindergarten, elementary, and secondary grades. In the same year, by arrangement with the Rush Medical College, the first two years of medical work were transferred to the university; the clinical work of the second two years remained in charge of the Rush Medical faculty on the West Side of the city. Early in 1902 a law school was created and law instruction was offered for the first time in the autumn of that year. On Jan. 10, 1906, President Harper died. Professor Harry Pratt Judson, who had served as Dean of the faculties, was at once appointed Acting President, and in February, 1907, was made President of the university.

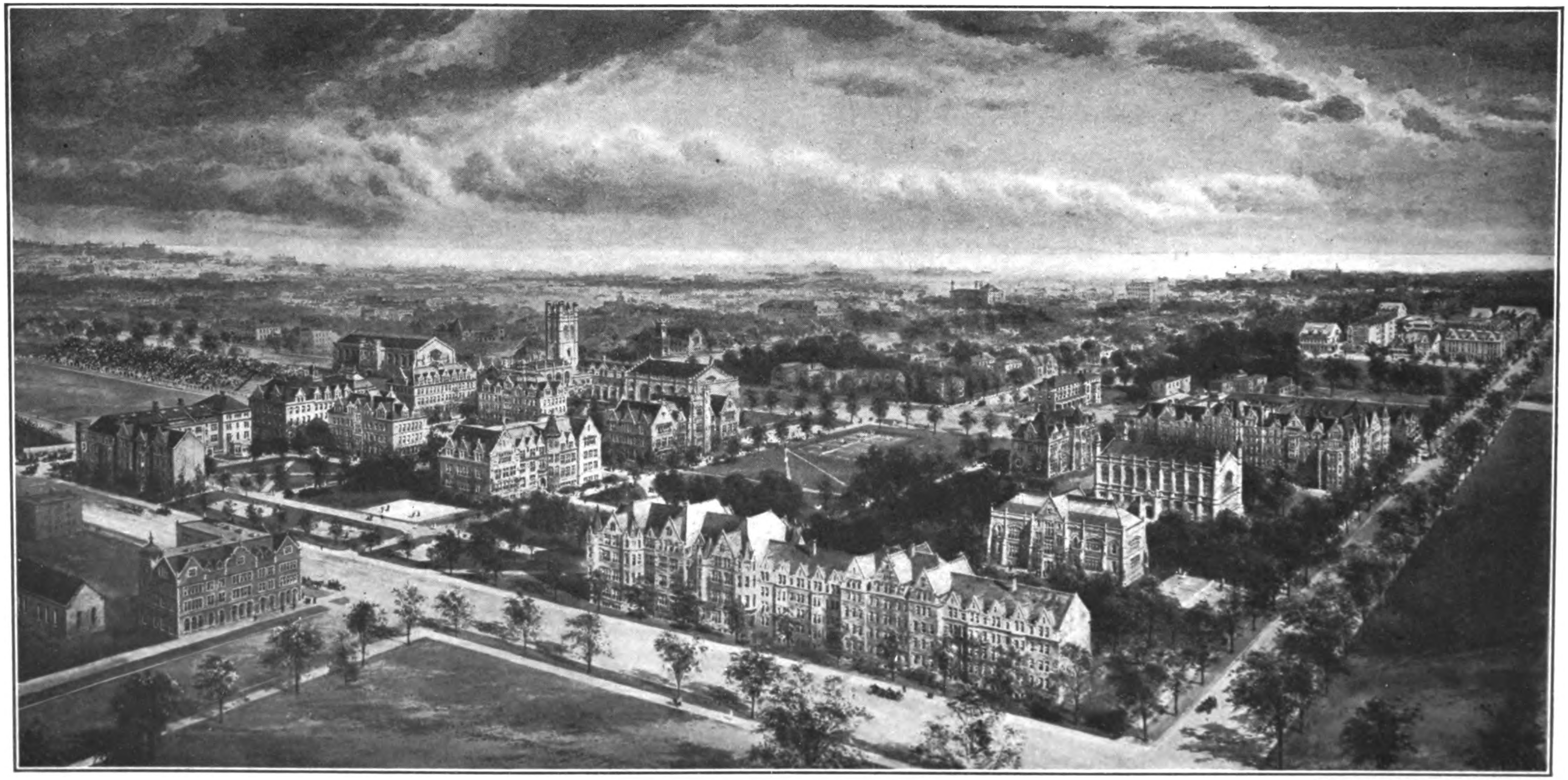
Organization. — The university is organized into five divisions: (*a*) The schools and colleges, including the Graduate School of Arts and Literature, the Ogden Graduate School of Science, the Divinity School, the School of Education, the Law School, medical courses which in combination with Rush College courses form a School of Medicine, the Colleges of Arts, Literature, Philosophy, and Science, the College of Commerce and Administration, and the University College. Each of these colleges, which comprise the four-year undergraduate course, is subdivided into Junior (freshmen and sophomores) and Senior (juniors and seniors). (*b*) The University Extension division, which includes lecture-study courses and correspondence instruction. (*c*) University Libraries, Laboratories, and Museums, which includes the general and departmental libraries and all the museum and laboratory resources of the university. (*d*) The University Press, which includes the manufacture and publication of books and periodicals, the retail book department, mailing and shipping department, and a department for the purchase and distribution of laboratory supplies. (*e*) University Relations, a division which supervises secondary schools and colleges with which the university sustains relations of affiliation or coöperation.

Government. — The Board of Trustees represent the final authority in the affairs of the institution. All appointments to the staff, all promotions from one academic grade to another, all appropriations for salaries and other purposes, are made by the trustees on the recommendation of the President of the university or committees of the board. Responsibility for educational policies and administration rests with the faculties, organized upon the following principles: (*a*) The autonomy of each faculty in deciding its own problems, subject to (*b*) the control of a central body, the Senate, charged with considering and furthering the interests of the university as a whole, and (*c*) the definite responsibility of each administrative board to some one faculty or to the Senate. The Senate includes all professors of full rank in all divisions of the university. In case the enactments or policies of two faculties are inconsistent or in actual conflict, the Senate may by a two thirds vote veto the action which has produced the difficulty. In a sense, therefore, the Senate serves as a judicial body. It may also initiate legislation subject to acceptance by the various faculties in so far as their prerogatives may be involved. Executive responsibility is intrusted to a series of boards which are either under the different faculties or, in the case of university boards, subject to a general administrative board made up of the deans and directors of the different divisions of the university. This general administrative board is responsible to the Senate, and is charged with coördinating the administration of the university as a whole.

The Faculties. — In organizing the teaching staff of the university in 1891–1892, President Harper sought as heads of the various departments men of academic distinction. In order to offer necessary inducements the rank of Head Professor was created, and the salary was fixed at $7000. The original head professors of the university were Professor Herman E. von Holst of Freiburg, Professor John Dewey of the University of Michigan, Professor J. Laurence Laughlin of Cornell University, Professor Harry Pratt Judson of the University of Minnesota, Professor Albion W. Small of Colby College, Professor William Gardner Hale of Cornell University, Professor William I. Knapp of Yale University, Professor A. A. Michelson of Clark University, Professor T. C. Chamberlin of the University of Wisconsin, Professor Charles O. Whitman of Clark University, Professors Galusha Anderson and G. W. Northrup of the Baptist Theological Seminary, Professor Ernest D. Burton of Newton Theological Seminary. The staff was rapidly recruited from the leading universities and colleges of the country. With the growth of the institution and the passing of pioneer conditions the head professor system became a source of embarrassment. The existence of a special rank of this kind made it difficult to secure additional professors for departments which needed more than one man of eminence. At the request of the head professors themselves the rank was abolished by the trustees, and the title " Professor and Head of Department" was substituted. A movement looking to the organization of departments on a still more democratic basis has recently received the approval of the university Senate, and will doubtless be introduced in the early future. A chairmanship plan which may dissociate distinction in scholarship and administrative ability seems likely to meet with favor. The faculties of the university in 1909 numbered 330. This number does not include 18 assistants, and of course leaves out of account all teachers in the practice grades and high school. A large number of men give themselves wholly to research work and to the direction of graduate study. Still others devote themselves almost entirely to undergraduate teaching, while a third group give both undergraduate and graduate courses. From the outset stress has been laid upon research and upon scholarly productivity on the part of members of the faculty.

Degrees. — On the recommendation of the various faculties the trustees of the University confer the following degrees: Bachelor of Arts, for an undergraduate curriculum characterized by the ancient languages; Bachelor of Science, for studies which are predominantly mathematical and scientific; and Bachelor of Philosophy, for a curriculum in which modern languages and the social sciences form the chief elements; Master of Arts, Master of Philosophy, Master of Science, for advanced work involving at least a year of residence and requiring specialization in two or more related departments; Doctor of Philosophy, for a minimum of three years of resident work, specialization in two related departments, and the preparation of a thesis which gives evidence of ability to do original investigative work; Bachelor of Divinity, after approximately two years' graduate work in biblical, theological, and ecclesiastical subjects; Bachelor of Laws, for a professional law course of at least three years in which a grade of scholarship has been achieved 10 per cent higher than that required for the degree of Doctor of Law, which is granted to candidates who have completed a three-year professional course in addition to an undergraduate course in an approved college, or who have combined a three years' professional course with the first three years of the college course in such a way as to secure both the Bachelor's degree and the degree of Doctor of Law. The degree of M.D. is not conferred by the university, but by the faculty of Rush Medical College after four years of medical studies in addition to the first two years of a regular college course for the Bachelor's degree.

Grounds, Buildings, Equipment, and Endowment. — The university is situated on the Midway Plaisance (Fifty-ninth and Sixtieth streets on the south side), halfway between Washington Park on the west and Jackson Park (site of the World's Columbian Exposition of 1893) on the east. The institution owns 90 acres, which include a three-quarter mile frontage on each side of the Midway Plaisance. The 31 university buildings comprise 3 recitation halls, 2 museums, 7 laboratories, 10 dormitories, 2 gymnasiums, an assembly hall, men's commons, a men's club, a law school, a College of Education, a Press building, power house, etc. The Harper Memorial Library, under construction in the spring of 1910, will be ready for occupancy early in 1912. All the buildings of the university, save the Press, are of one type of architecture — a Tudor Gothic. They are faced with Indiana limestone and roofed with red tile. An architectural scheme drawn up at the outset by the first architect, Henry Ives Cobb, has since been modified in many ways. All buildings, however, have been designed in harmony with the original type. A considerable range of variation in details is maintained within the limits of a single architectural scheme. The firm of Shepley, Rutan, and Coolidge of Boston, the official architects of the university, have modeled some of the later buildings after well-known academic halls of the English colleges. Thus at Chicago the University Tower is something more than suggestive of Magdalen Tower at Oxford; the Chicago University commons, known as Hutchinson Hall, is a rather close reproduction of Christ Church Hall, Oxford, while the Chicago University Law School brings to mind King's College Chapel, Cambridge. The buildings and grounds of the university were valued, July 1, 1909, at



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THE UNIVERSITY OF CHICAGO.

$8,917,708. The university libraries contained, on July 1, 1909, 492,292 volumes; the laboratory and other equipment of the university was valued at $670,527, and the productive funds amounted to $14,008,778. The annual budget of expenditures for the year 1909–1910 was fixed at $1,431,565. The tuition fees in the colleges and graduate schools amount to $40 per quarter, or $120 for the academic year. In addition laboratory and incidental fees are required, varying in amounts with the courses taken. In the Law School the fees are $50 per quarter, and in the Medical School, $60 per quarter. Fellowships in the Graduate Schools are provided to the amount of $21,500. The stipends vary from $450 to $120 each. Through appropriation by the Board of Trustees, and from endowment funds given especially for the purpose, the sum of $76,500 in honor and service scholarships is available for the aid of able and worthy students.

Distinctive Features of the University. — The university year is divided into four approximately equal academic periods known as quarters, the autumn, winter, spring, summer. The summer quarter is subdivided into two equal periods or terms. The omission of a vacation period between the spring and summer quarters gives a free period of about three weeks in September for renovations and repairs. Thus the university plant is used almost continuously. Although students are matriculated and degrees are conferred quarterly, custom and convenience cause by far the largest number of students to enter in the autumn. Thus, in the academic year 1908–1909, 47 undergraduate students matriculated at the beginning of the summer, 409 at the beginning of the autumn, 24 at the beginning of the winter, and 24 at the beginning of the spring. The quarter system makes each quarter a unit of study as well as a unit of time. Regular work consists of 3 courses, which meet 5 hours a week, or the equivalent of 5 hours in assigned work. Laboratory courses count at the rate of 2 hours in the laboratory for 1 hour in the lecture room. This plan involves concentration upon a few studies for a period of 3 months. The system on the whole has proved a success. The department of English is of the opinion that introductory composition courses might with advantage be distributed over two or three quarters instead of concentrated in one. In the Law School what amounts to a semester system is permitted, *i.e.* certain courses extend over one quarter and a half. Another distinctive feature of Chicago organization is the division of the undergraduates into two colleges, the Senior College, including the third and fourth years of the undergraduate course, and the Junior College, including the first and second years. This division is based upon the belief that the first two years of college have more in common with the high school course than with later undergraduate pursuits. The transition from the one kind of study to another is fixed at the middle of the college course, and is signalized by the title of Associate, which is granted to students who have completed the work of the Junior College. The undergraduate curriculum puts all the specific requirements in the Junior College, leaving the Senior College free for election, limited by prerequisites, within rather generously defined groups which lead to the three baccalaureate degrees. The University Extension is an organic part of the university. Lecture study courses of the English extension type are conducted by the university in cities and towns of the Middle West. Credit is granted to students who, by attendance upon these lectures, the reading of required books, the preparation of written work, and the passing of final examinations reach the necessary standard. Another form of University Extension consists of correspondence instruction. This is conducted by members of the regular university staff as well as by members of faculties of other colleges and universities. The work is thorough in its character, is conscientiously guarded, and is a valuable aid to hundreds of earnest students. Many ambitious school teachers are combining summer residence with correspondence instruction, and are thus working gradually toward bachelor degrees. No correspondence instruction is accepted in lieu of the one-year residence requirement for the Master's degree. Only under exceptional circumstances completely controlled by the departments concerned is nonresident work credited toward a Doctor's degree. The University of Chicago is unique in including in its organization a Press Department, which, in addition to printing all the official documents of the university, publishes 14 scientific journals and has up to 1910 published 400 volumes. The scientific journals of the Press are subsidized to the amount of the income on a half million of dollars. The university regards publication of a scientific character as a legitimate university function.

Statistics of Registration. — The quarter system, and especially the constituency of the summer quarter, cause the number of different students connected with the university in a single year to reach a high total, 5659 for the year 1908–1909. The total registration for the different quarters was: summer 3050, autumn 2705, winter 2758, spring 2404. In order to make the total number of 5659 comparable with the statistics of other institutions it should be reduced to a three-quarter basis, that is, by the use of the unit, one student in residence for 9 months. Calculated on this basis, the total registration becomes 3639. Of the number in the graduate schools for the year 1908–1909, 908 were men and 508 women. Of the undergraduates the men numbered 1038 and the women 859. The term " unclassified " is applied to students over 21 years of age who for satisfactory reasons are admitted to courses in the university, but are not candidates for degrees. Many mature and earnest men and women desire to pursue courses for which they have aptitude and need. These applicants are carefully sifted on admission, to eliminate weak students who may be trying to evade requirements. These unclassified students are therefore by no means identical with " Special Students," in the sense in which that term is often used. In the summer quarter many teachers are enrolled as " unclassified," not because they could not present proper credentials, but because they desire to postpone the routine of registration as candidates for degrees.

Graduate and Professional Schools. — The Graduate Schools are notable for the large amount of research in progress, the coöperation in investigative work of the faculty and advanced students, the number of strong men who are engaged in research and are also interested in teaching. In 1908–1909 the Graduate Schools of Arts and Literature registered 870 different students, of whom 398 were women. The Ogden Graduate School of Science registered 546 different students, of whom 110 were women. The Divinity School is distinguished by the fact that it gives its degrees only to college graduates; it insists upon the necessity of vocational training; it has an unusually large faculty, and in the academic year 1908–1909 registered 397 different students. No money subsidy is given directly to students of the Graduate Divinity School. This department conducts a significant work through its Scandinavian seminaries. Its journal, the *Biblical World*, and the *American Journal of Theology*, are important organs of publication. The students represent practically all the chief denominations in the country. The school is an integral part of the institution, and enjoys the liberty of teaching which characterizes a true university. The School of Law is noteworthy from the fact that it requires three years of college work for regular admission, that the first year of law may be counted as the fourth year for the bachelor's degree, that the case system of instruction is made a prominent feature of the training, that the three-year course is not local in its scope, but prepares the students to practice in any English-speaking jurisdiction. The student body is cosmopolitan; 123 different colleges were represented in the school last year (1908–1909). The school is committed to the principle that classes shall be small enough to afford thorough individual training. The library, which contains about 33,000 volumes, is in size and excellence probably the best library in the Mississippi Valley for the scholarly study of English and American law. Almost all members of the faculty give their entire time to the professional teaching of law. The faculty contains at present (1908–1909) 8 men, all professors of full rank. The total registration in the Law School for last year (1908–1909) was 303. The School of Education includes four organizations — a Graduate Department for the scientific study of educational problems, a College of Education in which students are prepared for positions as high school or grade teachers, a University High School for practice and observation work, and an Elementary School including a Kindergarten Department utilized as a pedagogical laboratory. The College of Education gives through its departments individual attention to various types of constructive work, but at the same time includes all the conventional materials to be found in other schools. Last year (1908–1909) the registration of different individuals in the College of Education was 958, of whom 837 were women.

Student Life. — The urban location, the predominance of graduate ideals, and the early impress of university standards have prevented the development of a strong college spirit among the undergraduates. Sixteen Greek Letter fraternities are represented at the university. A number of women's societies are also officially recognized. A men's club provides a social center for the male students, while the five women's halls, with their common dining rooms, reception rooms, etc., afford social life for many women students. Nearly 25 per cent of the students live in the dormitories of the university. About 70 per cent of the students have their local residences within a mile and a half of the university buildings. From the outset the standards of the institution have opposed undergraduate boisterousness and hoodlumism. A sane and sound student sentiment supports this tradition. Many undergraduates are interested in athletics, but the university community is by no means dominated by athletic excitement. A department of Physical Culture and Athletics makes it a policy to interest the largest possible number of students in many forms of wholesome and recreative exercise.

Educational Policy of the University. — The University of Chicago occupies a unique position with reference to higher education in the Middle West. Upon it largely rests the responsibility of maintaining and extending graduate work of the highest type, and the ultimate establishment of professional schools upon a graduate basis. On the other hand, the location in a great city throws upon the university the obligation to provide for undergraduate teaching. It is the aim of the university to fulfill both these functions with fidelity to the best standards and without sacrificing either task to the other. If technical and medical instruction as well as other forms of professional work are ever established or extended, it is altogether likely that they will be maintained upon a graduate basis. There will be no attempt to compete with existing institutions of the conventional type. So far as college instruction goes, the university will continue the policy recently undertaken of raising steadily the standard of undergraduate scholarship with a view to limiting opportunities to students who are able and willing to do work of a thorough character. G. E. V.

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CHICKASAW COLLEGE, PONTOTOC, MISS. — An institution for the education of girls and young women, under the auspices of the Presbytery of Mississippi. Preparatory, collegiate, normal, and fine arts departments are maintained. Admission is by certificate or examination, the requirements for which are indefinite. Degrees are conferred. There is a faculty of 8 instructors.

CHILD, GROWTH OF. — See Growth.

CHILD, THE INCORRIGIBLE. — See Abnormalities; Delinquents; Incorrigible Child; Truant Schools; Parental Schools.

CHILD LABOR. — In the social economy of primitive peoples, children begin to share the labors of the family or clan at a very early age. It is instinctive on the part of even very immature boys and girls to participate in the activities about them, to imitate occupational pursuits, to yield to authority and direction, and through these activities to obtain a certain degree of education on a natural scale. It is also customary, if not instinctive, for their elders to assign them tasks, to encourage their efforts and to contribute to their education. The work done by the children has been commonly of a fragmentary character, like chores, errands, and other minor tasks. There is no evidence that such industrial participation has often been harmful where oversight was exercised by those having a family or philanthropic interest in the child. In fact, it is now pretty certain that this sharing of economic activities is quite essential to the complete development of children from even 5 or 6 years of age onwards, when constructive workmanship instincts begin to appear. The labor of children under humane conditions, therefore, has been traditionally established, and has not been in general an evil. It became rooted in custom, and childish instincts allied themselves with it. It was the changed industrial and educational conditions of the latter part of the eighteenth and of the nineteenth centuries which caused a hitherto harmless institution to become an evil of large magnitude. The development of machine manufacture enabled employers to use children in gangs, and under systematic divisions of labor it took the children away from the sympathetic control of their parents; because of the simplicity of much labor attendant on machine production, employers were able to substitute children in large numbers for adult laborers. Competition among manufacturers and the ignorance or greed of parents or guardians steadily reduced the age at which children went into employment. This economic condition was the primary cause of harmful child labor; and except for the influence of prohibitive legislation, these conditions have become steadily more controlling. Production through machine increases; the opportunities for child labor grow; and competition puts a premium on managers who can exact the utmost of production from meagerly paid workers. Along with this the urbanization of peoples opens up a variety of occupations like street trading, messenger service, and minor forms of delivery and distribution, which in themselves become harmful.

As a basis for the modern attitude of social economy toward child labor, it is commonly accepted that factory labor for children under 14 years (1) is almost invariably injurious owing to its routine character, its night work and unhygienic surroundings, its unsympathetic supervision, and the opportunities it opens for immorality; (2) it is socially injurious in that it depresses the wages of adults and diminishes the available number of physically developed workmen for the next generations; (3) it is both socially and individually injurious in that it deprives the child of opportunities for educational development; and (4) it is economically unnecessary. It is on the basis of these principles that humanitarians have for upward of a century carried on their campaigns against child labor.

England. — Naturally, interest in the subject developed first in areas extensively devoted to manufacturing. The rapid revolution of industry in England drew attention to child labor as early as the later years of the eighteenth century. In 1802 the Health and Morals of Apprentices Act, the first factory act, was passed primarily to protect the pauper orphan children who were being herded into the woolen mills. These pauper children had been taken from parish councils, the manufacturers often receiving a premium for taking them as apprentices. The helpless children were subjected to most prolonged hours of labor, the death rate was enormous, and the manufacturer had no incentive to give the children adequate care. The Act of 1802 limited the work of the children carried on in woolen mills — many of the children being from 7 to 12 years of age — to 12 hours a day, provided that the night work of apprentices was to be gradually discontinued, and to cease altogether after June, 1804. It required that apprentices should be instructed in reading, writing, and arithmetic, and a suit of clothes given to each yearly. It provided that factories were to be whitewashed twice a year, and at all times properly ventilated. Separate sleeping apartments were to be provided for apprentices of different sexes, and not more than two were to share a bed. Apprentices were to attend church at least once a month, and the justices were to appoint two inspectors — one of whom should be a clergyman — to visit the factories. All mills and factories were to be registered annually with the Clerk of the Peace, and justices had power to inflict fines of from £2 to £5 for neglect to observe the regulations. The Act applied to cotton factories as well as to woolen, and the preamble made it applicable not only to apprentices, but to all cotton and woolen factories in which 20 or more persons were employed, although the clause relating to restriction of hours and providing educational facilities expressly applied to apprentices only. (See Hutchins and Harrison's *History of Factory Legislation*, pp. 16–17). Seventeen years later (1819) a more extensive act aimed at all factory work was passed, but it failed largely of application, owing to imperfect agencies of enforcement. It is suggestive to note that it prohibited the employment in factories of children under 9 years of age and limited the working hours of children from 9 to 16 years of age to 12 hours per day.

From this time for upward of half a century the humanitarians struggled with the *laissez faire* prepossession of British life for a protected childhood. The law of 1819 was not enforced, and a Royal Commission in 1833 found children working as much as 15 hours daily. The following year another act of a more comprehensive nature was passed, which (1) fixed a working day so as to abolish night work; (2) prescribed at least two hours' schooling for children under 13; (3) limited their working hours to 9; and (4) accomplished other reforms like fixing the length of the working week. The required schools, however, were commonly kept up by the factories themselves, and were of little educational value to the children. (See FACTORY SCHOOLS.)

In 1843 began the system of "half time." This was a compromise between the forces which sought the education of a child and the employers who desired cheap labor. The employment of a child under 13 was made contingent upon his regularly producing a certificate of attendance at school for at least 3 hours daily, or for alternate days. The amount of daily factory work was limited to 6½ hours. The half-time system, it will be seen, had points of correspondence with the situation in which children usually find themselves under primitive economic conditions — a distribution of time between school and work. Luther long before had said: "We must send the boys to school one or two hours a day and have them learn a trade for the rest of the time." But the opponents of child labor were not satisfied with the half-time system. The young children still suffered under factory conditions, and the school was often farcical. In 1878 half time was prohibited for children under 10, and this limit was raised to 11 in 1891, and to 12 in 1899. In 1904–1905 there were still over 80,000 half-time workers, nearly all in the textile districts in Lancashire, with a few in Dundee. Under existing enactments half-time labor can be corrected either by further parliamentary legislation or by acts of local councils. In 1908–1909 a strong agitation began to end half time for children under 14.

England obtained public education in 1870, and the comprehensive act of 1878 not only restricted child labor and clarified legislation pertaining to it, but also made education compulsory. In 1909 the age of exemption from school attendance was raised to 14, and the conditions of employment of children below that age who had completed school work were more regular and stringent. Children under 11 cannot be employed in agricultural work, and over that age must have completed the fourth grade. The next great step was in regulating the employment of children on the basis of the character of the work done. By the legislation of 1901, a variety of employments were prohibited to children under 16; girls and women were exempted from night work; physical conditions of work were safeguarded; and in factories and many trades youth under 16 must have a certificate of physical fitness. The next point of attack was the occupations of children outside the school hours. The number so employed in carrying milk and parcels in street trades and in home or sweatshop work was very large. So far, legislation has not overcome the evils in this field where work outside of school hours, coupled with school instruction, certainly results in the overtaxing of children. The Employment of Children Act of 1903, the result of the Interdepartmental Committee's report, greatly restricted such employment, and gave local authorities power to still further restrict the employment of children outside school hours. The Act of 1903 regulated street trading by providing for the licensing of children so employed, distinguishing, by the badge worn, children under school age and children above school age, in allowing the former to engage in trade only outside of school hours, but limiting the number of hours both with respect to the total number per day and the exact hours between which such employment is legal. (See Victor Clark's *Women and Child Wage Earners in Great Britain*, Bulletin of United States Bureau of Labor, Washington, January, 1909, No. 80, pp. 27–36.) Since the opening of the twentieth century, owing to a keen realization of the prevalence of physical and industrial incompetency among the population, Great Britain has been giving increasing attention to the problems of the productive work of children. The trend of recent legislation is along the most advanced lines described hereafter in the legislation of the United States, and its comprehensive character is shown in the celebrated "Children's Act" of 1908.

France. — The late rise of manufacturing in France and the persistence of household industries has deferred development in this field in that country. It is true that laws regarding apprenticeship date back many centuries, and that these still serve to safeguard the apprentice; but as a means of meeting the objections to child labor they are now futile. In fact, there are in Paris and other large cities a variety of abuses which in a sense are traceable to the existence of these laws. Existing French child labor legislation is simple. To enter on regular employment children must be 13, or must have completed the common school course, exceptions being made in certain cases in favor of seasonal industries like fruit packing. Up to 18, night labor is prohibited, and all labor in certain dangerous or objectionable industries. All youths under 18 must have employment certificates showing schooling, etc., and for those under 16 in many trades certificates of physical fitness may be demanded. Employment for youths under 18 is limited to 10 hours, and to that period for all women. France is still largely agricultural, and many industries are still domestic in character. Families are prevailingly small, the children well cared for, and relatively few tendencies toward exploitation exist. There are found no satisfactory statistics as to employment of children below 14. France has little legislation restricting household or agricultural labor, and this lack, coupled with the inefficiency of factory inspection, is at present attracting the attention of social workers.

Germany. — Legislation affecting children comes from two main sources — the Empire and separate states. The standard set by the imperial enactments expresses minimum conditions, the chief of which are: (1) All children under 13 must attend school full time, and may not work in industries between 8 P.M. and 8 A.M. (2) Restrictions on employment are greatly affected by the degree of relationship borne to the worker by the employer. Hours, time for meals, and rest, etc., are carefully regulated. (3) Children in school may not labor more than 3 hours per day, and during vacation not more than 4 hours. (4) Night work is prohibited to males under 16 and to all females. (5) Under 14 the factory working day is limited to 6 hours, and under 16 to 10 hours. In 1898 about half a million children under 14 were employed in industrial establishments which were not factories, and in agriculture. Only 9000 children of the above age were in factories. Obviously the large number above were in small shops; 58 per cent were reported as working in industries, and 25 per cent in delivery occupations. The various German states are at liberty to supplement the above legislation as they see fit. While the standards above set forth seem low, it is probable that a compensation exists in the rigid system of inspection which prevails and is carried out by the local police. Between school and shop almost all the time of the German child above 12 is claimed, but the paternal attitude which is adopted seems to contribute much toward preventing harmful results.

United States. — There is no national control of child labor. In 1907 five measures were brought before Congress, the aim of which was to enlist the services of the national government. The first was a bill incorporating a National Child Labor Committee; the second, a model child labor bill for the District of Columbia; the third, a bill to provide for a National Children's Bureau; the fourth, providing for an investigation of the labor of women and children under the United States Commission of Labor; the fifth, known as the Beveridge-Parsons Child Labor Bill, sought to prohibit the transportation in interstate commerce of child-labor-made goods just as convict-made goods are now excluded from foreign commerce under tariff laws. Only the first and fourth became laws that year, while the second was passed in 1908. The Beveridge-Parsons bill aimed to penalize interstate commerce where it could be shown that the labor of children had been employed, but the bill did not come to a vote in either house, owing to the conviction that it unconstitutionally extended the powers of Congress. Development and enforcement of child labor legislation and stimulation of public opinion has been for several years under the lead of the National Child Labor Committee. This society, which in 1910 had over 4000 members and a budget for expenses amounting to more than $50,000 per year, holds an annual convention. It keeps agents at work in those regions where the development of manufacturing industries renders the need most pressing. A review of its annual *Proceedings* provides the most complete commentary on recent developments. In its work this committee has laid down certain standard conditions to be met, which are the results of experience in endeavors to secure the kind of administrative machinery which proves effective in enforcing legislation. Then, according to local conditions and the state of local opposition, it makes accommodations as far as possible. In the course of this procedure it has become evident that the entire subject of child labor is vastly complicated, and the somewhat simple principles, unless adhered to, no longer suffice.

Standards for Legislation. — The following are the standards now usually sought: —

1. *Age or Development of the Child.* – No child under 14 ought to work in factories, shops, street trades, etc., and under 16 or 18 in occupations dangerous to health or morals, in several states the minimum age is yet 12; and even 10 or no age limit at all for orphans, or children of widowed mothers dependent on their earnings. In all states exceptions in age are made for occupations pursued outside of school hours. In some the minimum age is changed for vacations, especially where fruit and vegetable packing are important sources of employment. Obviously the age of the child is but a poor index of his development or his capacity for work. Hence physical tests are being imposed, as weight and height standards, like the minimum weight of 80 pounds and the minimum height of 60 inches employed in the New York law of 1903. To the authorities issuing the permit to go to work, some of the states allow the option of refusing such certificate if the child seems unfitted for the employment proposed.

2. *Education.* — One of the objects of child labor legislation being to secure to the child his educational rights, all programs endeavor to secure a minimum education, even when the child has passed the minimum age. Early attempts in this direction simply provide that the child be able to read and write. The objection to this has been not so much on the ground of its insufficiency as of its vagueness, which opens the way to all sorts of evasion. Recent legislation in Massachusetts, New York, Ohio, and other states sets a minimum limit in terms of a school grade, as, for example, the third in Massachusetts, the 5*a* in New York City, and the eighth grade in New Jersey. A different requirement as to the amount of school attendance to be made each year is also aimed at.

3. *Time and Amount of Work.* — The ideal of child labor legislation contemplates an 8-hour day for all youths under 16 and a week limit of 48 hours. These conditions are met at present in but few states, a 10-hour day or 56-hour week representing the best conditions usually attainable. Night work is opposed for boys under 16 and for girls under 18, and for all women, partly on physical, largely on moral, grounds. Prohibition of night work must usually indicate different hours, *e.g.* 7 P.M. to 7 A.M., during which work may not be done. Frequently exceptions must be made for mercantile business where late work is required on Saturday night or during holidays. Street trades to be carried on part time or outside of school hours frequently are exceptions.

4. *Poverty of Children.* — An old defense of early child labor rested on the fact of necessitous parents. Standard legislation now recognizes that cases of dependent parents occur, and that their existence should not deprive the child of his rights to education, health, physical development, and vocational efficiency. Hence private philanthropy or state aid must provide scholarships to assist those children who by virtue of their exclusion from labor are prevented from earning money to aid in the support of themselves or their dependent parents. In New York and other states private effort supplies scholarships; in Ohio and Colorado the state now provides books, clothing, and even food.

5. *Enforcement.* — Child labor legislation is rarely sufficiently supported by public sentiment and public knowledge to be self-enforcing. Experience has demonstrated the need of (*a*) certificates for all youths employed; (*b*) the posting of lists of all employees as well as hours of labor; (*c*) official inspection; (*d*) suitable penalties. The certificate must be possessed by each young person employed, showing age, place of birth, educational condition, etc. In reaching these standards many obstacles have been encountered, chiefly in the matter of establishing the age of foreigners. Experience demonstrates that the sworn statement of parents will not suffice. Birth or baptismal certificates or other positive evidence is now required. The recent tendency is to lay responsibility on school authorities for the issuance of these certificates. Experience also demonstrates that publicity on the part of employers is necessary. This includes the posting in public places of the lists of employees, with evidence as to their possession of the above certificates. All papers must be produced on demand of each truant officer or inspector. Working hours must also be posted. In a few instances it has been found necessary to penalize the concealment of child employees on occasion of inspection. State agents or inspectors are necessary to the enforcemet of the laws. In practice these are attached to the State Labor Department or division for factory inspection. These officers should include a number of women inspectors, as indicated in the last law on this subject in Ohio. They must give their entire time to inspection, and should be obliged to keep records of such a nature as to demonstrate the efficiency of their work.

The trend of public opinion in the United States with respect to child labor is fairly well indicated by a summary of the important details in legislation on this subject during the past 5 years. The Secretary of the National Child Labor Committee submitted a statement at the end of the year 1909, which showed that during the previous 5-year period 13 states and the District of Columbia had established inspection departments for the enforcement of child labor laws; the 8-hour day for children had been established in 10 states and the District of Columbia, and the hours of labor measurably reduced in 13 additional states; 6 states and the District of Columbia passed child labor laws for the first time during this period, and Nevada is the only state in the Union without a general and comprehensive act, although many of the laws are below what is regarded as a normal standard, both with respect to their prohibitions and the provisions for their enforcement. Some further comparisons are to be noted from the following statement. In 1904 the 14-year age limit applied to factories, stores, etc., in 12 states, and in 1910 in 19 states, while in the latter year the law usually included offices, laundries, hotels, theaters, and bowling alleys, as well as stores and factories. In 1904 the 14-year age limit in factories only applied in 9 states, in 1910 in 11 states. For mines the age limit in 1904 was 15 in one state, 14 in 19 states, and 12 in 5 states, while in 1910 it was 16 in 6 states, 14 in 18 states, and 12 in 8 states. The employment of children was forbidden during school hours in only 14 states in 1904, but in 23 states in 1910. The 13-year age limit in the general law applied in Pennsylvania and Rhode Island in 1904, but only in North Carolina in 1910, while the 12-year age limit in stores and factories applied in 2 states in 1904, and for factories only in 8 states, while in 1910 we find it in 3 states applying to stores and factories, and to factories only in 12 states, but in the latter instance restricted to vacation periods in the schools. There were no general restrictions of child labor in 6 states and the District of Columbia in 1904, but only in 1 state in 1910. Night work was prohibited in 13 states in 1904, — the age limit varying from 12 to 18, — while in 23 states there was no prohibition; but in 1910 night work is prohibited in 23 states for children under 16, in 7 states for children under 14, and in 2 states for children under 12. Special exemptions on account of poverty, orphanage, and the demands of seasonal and privileged industries still exist in many states, but they are gradually being reduced in number, and special evils — such as those of the night messenger service — are being more widely recognized, and are gradually yielding to more effective restrictions.

In 1910 New York passed an act prohibiting the employment of boys under 21 in night messenger service between the hours of 10 P.M. and 5 A.M. in all cities of the first and second class. Ohio passed a similar act, prohibiting children under 18 from working in the messenger service between 9 P.M. and 6 A.M. Other state legislatures are discussing similar efforts to suppress the moral evils of night messenger service as lately revealed by the investigations of the National Child Labor Committee. During 1910 other significant legislative advances were made in child labor restrictions in New Jersey, Massachusetts, Maryland, Virginia, Rhode Island, and Kentucky, the most notable of which was the victory in New Jersey for the suppression of night work for children under 15 until July 4, 1911, and after that date under 16, the proposal for which for five successive legislative sessions had been successfully opposed by the glass manufactures of the state.

The refinements of restriction and protection are not as fully developed in the United States as in Great Britain, but, on the other hand, many of our states show greater boldness in dealing with the evils of child labor upon a large and comprehensive plan, while the greatest need in the United States is still, perhaps, the proper coördination of a restrictive policy with a constructive program for the recreation, training, and education of children, including proper provision for industrial and vocational training, without the exploitation of the child for the benefit of others.

D. S. AND S. M. L.

See ATTENDANCE, COMPULSORY; CHILDHOOD, LEGISLATION FOR THE CONSERVATION AND PROTECTION OF.

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CHILD PSYCHOLOGY. — Childhood is usually considered to cover the period between infancy and puberty, or, roughly, between the ages of 3 and 12. Child psychology must then deal with the mental life, the thoughts and feelings, together with their influence on conduct, of children between these ages. Child psychology is a comparatively new study. It is only within the last half century that the need for such a specialized branch of psychology has been realized. The trend of development has been along the line of investigating the differences between children and adults in the various mental states. A science of adult psychology being already well established, when it began to be realized that the child was not the " man writ small," and that there was such a possibility as a study of child psychology, the natural question was, " Just how does the child differ from the adult in his power of perception, his reasoning, his attention? " The fact that much of the interest felt in this new study was for the sake of its relation to adult psychology, together with the fact that the need for such a study was felt primarily in connection with the school education of children account, in some measure for the apparently hit-or-miss, trivial, and irrelevant character of much of the work which has been done. Also the newness of the field, the difficulties attending experimental work with children, and the length of time which it is necessary to carry on investigations in order that the results gained may be reliable, all help to explain the lack of a complete, well-organized, significant body of knowledge. Much of the work in this department of psychology must, therefore, be regarded as tentative and open to further modification, but suggestive for educational application. The chief questions, then, which have been answered by child psychology are, " How do children differ from adults in the various mental states? What are the major changes which take place in their mental life up to the period of puberty? What are the chief causes of these changes? "

The difference between children and adults in instinctive equipment is not so much a matter of difference in number of instincts, although some of those characterizing late adolescence are lacking, as in relative prominence and strength of the various instincts, in their modes of manifestation, and in the degree of their modification through habituation. In childhood, because of lack of experience, the instincts manifest themselves in very general and indefinite ways, the particular line of manifestation being determined by the environment. The instincts, because of their correlation with the physical growth and development of the nervous system, tend to follow a rhythmic order of development, one set being prominent for a short period, then another. The phase of each which is prominent at first is associated with the physical well-being of the child. The response is to a concrete, very definite situation, and the result gained is immediate, physical satisfaction. Growing out of this stage is the interest in and the desire for emotional satisfaction. The child acts in such a way as to select those responses which bring him this result. This is the time when the various powers brought out by instinctive action are tested and tried and pitted against those of other children. It is the stage of personal competition. First one instinct and then another is experimented with, the emphasis being on motor activity. Still the child's point of view is narrow, the self that is being pleased and satisfied is a very partial one. It is still the individual interests against the group interests, or, rather, in spite of the group interests. The next development is the appearance of the " gang " spirit. This phase pervades and influences all the growing and changing instincts, paving the way for the more radical changes which take place at adolescence. The child is still interested primarily in his own well-being, but the self has expanded, the so-called social self now becoming prominent, carrying with it a greater emphasis on the intellectual elements in the situation.

The instinctive life of the child follows this plan in development, becoming more complete as more of the instincts emerge, more highly specialized as various phases become differentiated, the line of advance being from the physical through the emotional to the more intellectual phases of each, and from a narrow, partial viewpoint to a broader, more general one. These phases are not distinctly marked off from each other, even within the development of the same instinct, and as the various instincts develop at different rates and become prominent at different ages, there is great complexity and constant overlapping.

The part to be played by education in this development will depend largely upon whether those in control believe that these changes occur primarily as a result of inner growth, or as a result, partly at least, of the influence of environment. The consensus of opinion at present seems to be that both factors count, but that neither has full control. The more the environment presents situations calling for the exercise on the part of the child of the higher and more uniformly useful phases of the various instincts, the better, provided that the demands made begin at the level of development at which the child is, and gradually change in difficulty, complexity, and character. The various studies made of children's interests all show these general tendencies, and all offer material of value to the educator. Naturally, attention goes hand in hand with interest. The important differences between the attention of the child and that of the adult grow out of, and are caused by, the differences in the interests of the two classes. The interests of the former are determined directly by instinct, those of the latter more largely by training, custom, and habituation. The attention of the young child, attracted by the things that interest him, is given at first to brightly colored objects, loud sounds, moving things, good things to eat. Later he attends to new toys, feats of physical prowess, games involving skill of one kind or another. Gradually, as his instincts develop, and he finds that he derives personal benefit from so doing, his attention passes to things considered more worth while by people in general, until finally he comes to attend to the symbols of mathematics, the arguments for free tariff, or the methods needed in making a fortune. The kind of situation capable of attracting and holding the attention depends upon the instinctive equipment of the individual, but it also depends upon his experience. The things considered worthy of attention by society at large must in some way be connected with some native interest or instinct.

Another characteristic of the immature mind is its lack of steadiness. Attention is constantly changing, remaining focussed on an object or idea for a very short period of time, and then moving on to something else. The child is at the mercy of his surroundings, unable to resist the attractiveness of anything coming within the focus of consciousness. With experience and growth two changes occur. First, any one line of thought is capable of holding attention for an increasingly longer period of time, because of the greater possibilities of association and elaboration, and second, the child learns that it is to his advantage to overcome the tendency of attention to shift, and to hold it to the task in hand, despite the effort involved. Instead of requiring constant change, the child gradually becomes capable of prolonged periods of activity along one line, and that, perhaps, one formerly of little interest to him. In other words, as the child grows older, his power to give attention increases in breadth, strength, and duration.

The changes in perception occur along three lines; namely, a decrease in the proportion of mental life that is perceptual, an increase in the clearness of percepts, and a narrowing of the field of perception. The young child is essentially sensory and motor, therefore his mental life must be made up very largely of percepts. As he grows in experience, the higher mental states increase in proportion, for, instead of allowing his attention to be ever drifting from one sensory experience to the next, he fixes it on one and holds it there for an increasingly longer period of time. This fixing and holding of attention by one sensory experience to the exclusion of others must involve the use of other mental states and thus decrease the proportion of percepts. It is often observed that a young child sees and hears much more of his environment than the adult does, but of necessity the percepts gained in this way must be vague, hazy, and often inaccurate. Only by fixing attention, comparing, contrasting, noticing details, is full knowledge of the situation gained and percepts made clear, definite, and accurate. The work of many investigators emphasizes this increase in power of discrimination with advancing age, showing that children of 16 do from twice to three times as well as children of 6 in tests of power of sense discrimination. The development of the instinctive interests of the child, together with the training which he receives, both tend to discourage and inhibit general, indiscriminate observation, and instead to focalize it along certain definite lines, so that perception, like all other parts of mental life, tends to become specialized and developed in the directions in which it is used. Thus the older child perceives more in some fields than the younger child does, the specific fields depending very largely on the training which he receives. From an educational point of view, the need for a broad sense experience for the young child cannot be overemphasized. His proficiency in the manipulation of the more complex mental states is directly correlated with the richness, clearness, and breadth of his early sense perceptions. The need for developing rationally in connection with daily experiences, the power to perceive his environment, using all his senses as needed, and then to coördinate and correlate these experiences with his life of thought and action, this is of paramount importance, and comprises a large part of the school education of the child under 10.

In mental imagery the two chief differences between children and adults are in the vividness of the image and in the kind of image used most frequently. It is a common occurrence for the young child to confuse the productive, creative image of his play life with his memories of actual experiences. The numbers of children under 8 years of age who have imaginary companions confirm this tendency. From the adult point of view, the child is often telling a lie, but probably a large proportion of the lies told by children of this age are due to a real confusion. This confusion arises from two causes, — the great vividness and reality of the child's play life, and the lack on his part of a consciousness of the need of distinguishing between it and the realm of real life. Experience and the training of the perceptive powers usually correct this difficulty.

The second difference, that of the kind of mental image used frequently, is of more importance. The more immature the mind, the greater the likelihood that it will deal with images of concrete experiences, with possibly the visual image in excess of the other types. Maturity plus experience tend to increase the value of the less concrete and faithful images. The child thinks in terms of the concrete object or sound, whereas the adult uses some symbol standing for and representing the experience. A step in this progress from concrete to more abstract image is probably the so-called generic image, which partakes of the nature of each. The acquisition by the child of language, both in its oral and its written form, must condition this development. The value of the verbal image over the concrete in certain cases is very great. It is more convenient, saves time, is more accurate, and is more universal, but the child only discovers this after a prolonged experience with perceptual language. Functionally, the concrete image seems of little use, the original experience, and the symbol, verbal or otherwise, which stands for it being the important elements.

Education, then, should see to it that the child has clear, definite percepts, and then that the most convenient symbols are firmly welded to them, that the images of symbols to be used in later life may have a rich reference to concrete experience. Also it should encourage the natural creative imagery of the child along profitable lines, making possible for him the reconstruction of his environment as well as the adjustment to it.

The changes which take place in a child's memory with advancing years are unmistakable. Their cause is probably complex. Power in immediate memory increases up to about 15 years of age, and then remains stationary. Power in logical memory increases in a greater proportion than power in desultory memory. The changes taking place in attention, interest, and perception probably account for this improvement, in spite of the fact that the primary retentive power of the brain increases little or none, or possibly even decreases with age. The ability to concentrate the attention and the repetition of experiences, both of which come with growth, tend to fix the material. The broadening and the correlation of experiences, and therefore the increase in number and in organization of the associations, also tend to hold facts in mind, which in earlier years would not have remained. Logical memory is affected more than desultory memory, because all of these changes resulting in improvement of the function influence the former, while only some of them influence the latter. Any change in the kind of experience attended to will necessitate a change in the material remembered. Hence, changes in interests are paralleled by corresponding changes in memory, the development being from the concrete, sensory, and motor to the more abstract and relational elements of situations. The methods used in educating the memories of children must take into consideration and be molded by these factors. The things worth remembering must be attended to by the child, and associated with other experiences in a systematic way. The emphasis should be on mental activity on the part of the child, resulting in organization, rather than on mere impression from without. The value of correlation of subject matter, the need of time for assimilation and reorganization of systems, as well as the varying importance, at different ages, of the other factors influencing memory, all add to the complexity of the problem of education in the field.

Most students of adult psychology, and practically all students of children, agree that the higher processes of thinking and reasoning are not the exclusive possession of the mature mind, but that children, at least those of school age, also use them. The difference between the two is not in the absence of these processes, but in the accuracy of their manipulation and in the frequency with which they are used. The inaccuracy of the results of the reasoning of children is due to several causes. Reasoning and thinking require the use of relationships, meanings, and judgments, as well as feelings of concrete experiences. These mental states are the result of growth and experience, and their number, definiteness, and accuracy will condition the thinking power of the child. Lacking certain knowledge of relationships or meanings, through lack of experience, the child's thinking must be inaccurate, despite the presence of the necessary technique. The characteristics of his attention and memory also help to explain the inaccuracy of results when he reasons. In reasoning and thinking one must follow consistently and closely a train of related thoughts. This requires power of concentration of attention and organization of facts. The child lacks ability in both lines. His mind wanders from the problem because of lack of attention, or he gets sidetracked because of lack of organization, — in either case a wrong conclusion may be the result. His lack of skill in using language is also a drawback, for he must use symbols, not concrete imagery, in much of his reasoning. The fact that he often tends to use the concrete whole, instead of the essential relationship or aspect, results in the reasoning by analogy, which is a characteristic of immature minds. This power to think in terms of parts or elements or aspects of a situation is conditioned by the child's ability to analyze. Power to analyze is a later development than power to associate, and comes only with much practice. The fact that the adult reasons more often than the child is probably not due so much to a difference in power, as to a difference in the demands made upon him. His environment does not encourage the child to reason, for usually no responsibility is allowed to rest upon him. In fact, he gets on much more comfortably when he does not attempt to think for himself, but simply does and believes what he is told. The receptive, submissive attitude is the one considered to be characteristic of the child mind, and hence everything is arranged to encourage it. The adult, thrown on his own responsibility, forced by circumstances to take the initiative, reasons more frequently, but even he really thinks but seldom, and then only when he is forced to do so by the pressure of some problem whose solution is vital to his wellbeing. The broader and the more systematized his perceptual experiences, the greater his control of the higher mental states and language, the greater his power of attention, the greater his practice in dealing with problems pertinent to his everyday life, the greater will be the child's power of reasoning and reasoning well. Education that is definitely planned to do so can aid development along each of these lines.

The emotional life of the child differs but little from that of the adult. With the exception of the emotions connected with sexual development, all the emotions experienced by the adult are experienced by the child, but in a cruder and more elementary form. There is less inhibition by the child of the physical concomitants of the emotions, and therefore they often appear, probably wrongly, to be more intense than those of the adult. They certainly are more transitory, due probably to the rapid change in the focus of attention. The emotions of childhood, correlating as closely as they do with the instincts, are less complex than those of adult life, with its mixture of motives, influence of custom as well as the presence of the sex emotions. The duty of education is to inhibit the emotions that are harmful to the individual or to the race; to encourage those that are uplifting, and to connect them strongly with conduct; to develop true self-control on the part of the child rather than mere repression; and to connect an emotional tone with the ideals, which are an outgrowth of productive imagination, in order that they may be of functional value.

The child cannot be considered as either truly religious or truly moral. His condition is best described by the terms "unmoral" and "unreligious," although the basis of true religion and true morality must be laid in childhood. The springs of each are to be found in those general and indefinite instincts which are peculiarly human, and which have to do with the child's relation to his fellows and to his God. Lacking the power of effective deliberate choice in matters of conduct, because of the paramount power of the cruder forms of the instinct of self-preservation and the paucity of true ideals, the essential element in both morality and religion is lacking. The child's morality and religion are largely but reflections of the attitude of those around him and the result of actions which have brought him satisfaction. His standards of right and wrong are purely personal, determined by the results of his actions, and therefore dependent on his immediate surroundings.

Education should help the child to form habits that later will have a moral or a religious reference. It should encourage him to act always from the highest possible motive, not from any abstract, adult reason, but because it pays, exercising reason and choice in these directions as truly as in any other. It should give him definite knowledge of the field of religion and morality which is suited to his stage of development. It should encourage the formation of ideals of right conduct which function. From the point of view of conduct the ages from 3 to 12 are preëminently the years for the formation of habits. As mental life is of value as it influences conduct, it follows that this too is the period for the formation of mental habits. The control of instincts means but the formation of habits of inhibition of some and of modification and strengthening of others. The changes in interest and attention are due largely to the formation of habits along certain lines. The development in perception and memory is caused by habituation in directions that result in economy of effort and ability to satisfy the increasing demands of environment. Even power to reason well is conditioned by habits of thought. The selection and fixation of useful habits along all lines of motor and mental action seems to be the most fruitful line of development during childhood. And yet care must be taken that the habits do not become too ironbound, but that from them is evolved the principle or ideal needed to make conduct rational in order that adaptation to new conditions be possible. These principles and ideals, of such vital worth to the adult, are possible only after the concrete individual habits, whether of thought or action, have been formed. Childhood is the time to lay this foundation. N. N.

For detailed information on the various topics, see the articles on ACQUIRED CHARACTERISTICS; ATTENTION; MEMORY; MORAL EDUCATION, etc.

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CHILD STUDY. — Sometimes called Paidology, or Child Psychology; it is of comparatively recent origin, although some knowledge of child characteristics has been possessed wherever there have been parents and schools.

Historical. — Until recent times, however, most parents and teachers have been so occupied with the adult idea of what children should become that they have attached little importance to what they really are. Naturally, therefore, little was done in the way of investigation. In the last quarter of a century knowledge of children has steadily grown under the influence of increased emphasis by educational leaders upon the differences between children and adults, and the necessity of recognizing these differences; and under the influence of evolutionary theory which calls attention to the transitions from lower to higher forms and emphasizes the importance of studying the earlier phases of development in order to understand the later. These two influences, together with increased interest in man and new methods of studying him, especially on the mental side, have given a strong impulse to the study of children, and resulted in the accumulation of a large mass of information of greater or less scientific and practical value.

As knowledge of mental development has increased, child study has become differentiated into two branches of knowledge, Child Study and Genetic Psychology (*q.v.*). The latter represents the broader and more scientific phase of the subject, and includes a consideration of the development of mind in animals and in the human race, while the former, though founded on the same principles as the latter, is limited to the consideration of the development of human beings from infancy to maturity. Child study has always included a study of facts of physical development, and it is in the knowledge of the child's physiological development that the most definite results have been attained. Of the earlier leaders in child study, the three best known are the following: Darwin (*q.v.*) in England, who observed his infant son with the same interest and accuracy that he showed in studying plants and animals; Preyer in Germany, who with the training of a scientific physiologist and psychologist prepared a two-volume study of the first 3 years' development of his boy; and G. Stanley Hall in America, who has directed extensive, statistical studies of children and has stimulated others to work in popular and scientific child study, both in America and to some extent in other countries. At one time a wave of popular interest spread over the country and many local and state child study societies were formed and a great variety of outlines prepared for the study of children by teachers and parents for practical and scientific purposes. Many of these societies have ceased to exist, and it is now generally recognized that parents and teachers cannot be expected to make scientific investigations, but that they can profit greatly by the researches of scientists, and they may with proper direction collect data of value to specialists. Although the societies directly concerned in promoting the study of children are less numerous than formerly, the interest in children as children, and not simply as future adults, is much greater than ever before. This is strikingly indicated by the fact that, whereas a score of years ago stories in which children were the chief characters were almost unknown in popular magazines for adults, they are now found in almost every issue. The subject of child study is now a part of the course of study in every progressive institution engaged in the training of teachers. Physiologists and psychologists are also interested in studying children as a means of developing a more complete knowledge of their particular sciences. In educational administration and in sociology, problems of childhood are now receiving a great deal of attention. Child labor, compulsory education, truancy, delinquency, playgrounds, defects, deficiencies, and abnormalities of children, juvenile courts, health movements, etc., all bring into the foreground the importance of more thorough knowledge of child nature and the conditions favoring normal, healthful development.

The educational theories that helped to start child study investigations have been developed into a more definite body of knowledge, which is greatly modifying the science and art of education. The old idea, that children are to be treated as undeveloped adults, and that they should be made into adults in all their characteristics as soon as possible, has given place to the established fact that children are different in all their physical and mental characteristics from adults. The generalizations of child study have materially modified courses of study and methods of teaching. The kind and amount of work to be done has been modified so as to conform more closely to the child's natural interests and ability at different ages, and more emphasis has been placed upon the child's physical, mental, and moral development at each age, and less upon the acquisition of knowledge and skill suited to adult life.

Methods. — In studying children, one or more children may be studied intensively through a long period of time so as to determine the changes that take place with increased age; or a large number of children of different ages may be compared by means of measurements and tests and the common characteristics of each age determined statistically. Neither method alone is sufficient; each supplements and corrects the other. To the difficulties attending all psychological investigations are added many others when children are the subjects. In obtaining facts by means of observation, parents have the best opportunity to observe children in their various moods under normal circumstances, but the observations of parents are likely to be lacking in definiteness and accuracy. Specialists may make more accurate observation, but their opportunities are not so good and much time is required for the child to become used to the strange observer. In studying children by means of tests and experiments like difficulties appear. Children are so suggestible and so easily thrown into unfavorable attitudes by the new situation and the demand that they follow directions, that results vary greatly with each group with varying conditions and with the personality of the investigator. Even physical measurements, such as determination of chest expansion, vary greatly with the amount and kind of psychological stimulus given by the one making the measurements. No studies carried on by means of language can be made in the case of very young children, and even with older ones the chances of understanding what is wanted and of inexact and inadequate expression on the part of the children are much greater where language is involved than in the case of adults. Hence the *questionnaire* method must be used with great care.

The successive changes from infantile character to those of childhood, youth, and manhood are not wholly the result of external influences, but depend upon internal tendencies which lead to development in a certain way only slightly less inevitable than that by which a grain of corn develops blades, stalk, tassel, silk, and ear in the order named, rather than in a reverse order. Just what the order of development in a child is and how far it corresponds to the order in which the race has developed has not as yet been determined in detail. (See CULTURE EPOCH.)

General Results. — The child has so many characteristics, some of which change at one time and some at another, that it is difficult to summarize clearly the chief facts of his development. Physically, the child grows very rapidly at first, then from about 5 to 12 at a nearly uniform rate. This is followed by a period of accelerated growth, which after two or three years decreases gradually till maturity is reached. The period of more rapid growth is not the same for height as for weight, and is not the same for one part of the body as for another. (See GROWTH.) In movements, the chief change is not in number, but in definiteness, accuracy, complexity, and coördination of many parts of the body for specific ends. Reflex and instinctive movements are replaced by habitual movements, and random movements by specific voluntary acts.

Consciousness is at first an observer rather than a director of behavior, and only gradually do the different mental states become clearly defined. The instinctive emotions are early differentiated, and later the sentiments are developed. All forms of intellectual development take place at once, but perception of things present is most prominent for the first 6 years, then imagination of things not present, and finally conceptual thinking. In acquiring the power to gain desired ends there is always shown a great deal more activity than is necessary, and only gradually are short-cut methods of doing things acquired. These improved methods develop largely in a negative way, through dropping out of movements and attentive acts which do not lead to the end desired. Later, positive development takes place through conscious and voluntary emphasis upon the more advantageous movements, and by imitation. In the transition from play to work, from free, wasteful, slightly directed activity to restricted, economical direction of activity to the attainment of an end, games which are pleasurable but which require the direction of activity according to rules are an important factor.

In the early years nearly all the learning of the infant is by the method of trial and success, while the child in the next stage makes his most rapid progress through the more economical method of imitation, in the use of which he profits by the experience of others. After the child has learned a language and attained a considerable degree of representative and conceptual development, he readily learns by the ideational method what he cannot learn by experience or by observation of others. The most conspicuous defect of method in all schools, which child study is correcting, is that of too early and too great emphasis upon the ideational method of learning.

In the light of the general truths already established, it is safe to conclude that the person who has the characteristics of each age well brought out will ultimately attain a higher type of adulthood than one who is made to take on as rapidly as possible adult characteristics.

Physical Defects. — The study of children has established very clearly the truth that physical and mental development are closely correlated, and that physical defects, especially of certain kinds, are sometimes more influential than all the mental influences that can be brought to bear upon the child. Aside from general ill health the physical deficiencies that most frequently retard or prevent the normal mental development of children are nervousness, sense defects, and adenoids (*q.v.*). The nervous child is in general lacking in power to control his movements and his thoughts and emotions. His responses to sensory and emotional stimuli are excessive, so that he is easily made to jump, laugh, or cry. He fatigues easily, partly because he gives out more energy than is necessary, and partly because he has little or no reserve energy. When fatigued, his nervousness increases. A child who is restless before recess and quiet after vigorous play is not nervous, while the one who is more fidgety after recess probably is nervous. Sometimes a child who is simply lacking in nervous force shows no sign of nervousness until he is fatigued. One of the most common and disturbing forms of nervousness, usually known as St. Vitus's Dance (*q.v.*) is, if properly treated, not serious in its effects upon mental development. In its milder form there are simply irregular twitchings of tongue, lips, facial muscles, or fingers, while in more serious cases there may be violent jerking and twitching in all parts of the body. The disease is common in primary and intermediate grades, and is especially common in girls at 13. Attacks are most frequent in the spring, and often last about 8 weeks. The chief remedy is as complete rest as possible, with nourishing food and no fright or worry whatever. If home conditions are at all favorable, the child should never be in school for his own good and still more for the good of the school, because all forms of nervousness are as catching as any infectious disease. Stammering, a hesitancy in speech, and stuttering and irregularity in the action of the vocal organs may be regarded as forms of nervousness. There is lack of coördination in the various muscles involved in speech, and sometimes spasmodic contraction of some of them. The condition is increased by excitement or self-consciousness, hence these should be guarded against as much as possible. Singing and concert repetition are helpful, but severe cases yield only to special treatment by an expert. Adenoids are more or less abnormal growths at the back part of the nose where it opens into the throat, that partly and sometimes wholly close the openings so that breathing must be carried on wholly or in part through the mouth. This is a very common disease, especially in the primary grades, though if not attended to then, the severer cases will be found in higher grades. It is essentially a children's disease, as the growths dry up and atrophy in most cases before maturity is reached. The effects of adenoids may, however, last all through life.

Sense defects of any kind place a child at a disadvantage, and unless he is able in spite of this handicap to keep up with his mates in school for the first year or two, they produce increasing retardation. On the other hand, if he is able to acquire the same knowledge as other children during the first two or three years, he is likely to progress as well as normal children after that. This is why children with sense defects, especially auditory, are often either very backward or very bright. After a child has gained a fairly accurate perceptive knowledge of things and has acquired an auditory and visual language, his further mental development can proceed quite well, even though the sense organs are defective. Aside from the handicap in manual and intellectual activities, caused by sense defects, they may seriously affect a child's health or his character. The first more often results from defects in sight, and the second from defects in hearing. If the child can see, but only by a much greater effort than normal children, headache, nervousness, and other disorders frequently result. The child who cannot hear well is frequently misjudged by the teacher and treated in ways that render him indifferent, stupid, sullen, or resentful. It is unquestionably a fact that even the brightest and most observant teacher in the course of ordinary school work, where her attention is directed toward intellectual rather than sensory activities of children, may fail to discover very pronounced sense defects. Such a teacher, and also others less acute, can, however, by making a special test of the condition of sense organs, easily discover all the serious cases. Such tests should be made every year upon all except perhaps first-grade children, and parents should be notified when necessary that an expert should be consulted.

Child study has led also to increased criticism of the graded system in education, and to numerous attempts to improve it and adapt the work more fully to individual needs. Careful measurements show that from 70 to 85 per cent of the pupils in a grade can be comfortably seated in standard seats that are not adjustable, but to insure proper seating most progressive schools have the room completely furnished with individually adjustable seats. (See Desks.) About the same proportion of children can probably be successfully educated by class methods in regular grades, while the others need either special classes or individual instruction.

Instincts. — The instinctive tendencies of children, it is now generally recognized, give them their fundamental characteristics and determine to a considerable extent each stage of their development.

Children have all the types of instincts common to animals, along with a number of others that are either absent or of slight importance in animals lower in the scale than man. These instincts may be grouped as follows on the basis of use. (1) Self-preservative or individualistic instincts, which include all native tendencies to action that contribute primarily to the preservation of the individual. These are concerned especially with (*a*) feeding or getting and taking of food, (*b*) fearing or avoiding and escaping danger, and (*c*) fighting or struggling with enemies or mates for supremacy. (2) Group or parental instincts, which impel to acts by which the species is propagated and preserved. These are shown in two forms: (*a*) acts connected with the production of young, and (*b*) caring for them during a longer or a shorter period. (3) Group or social instincts, which include actions that tend primarily to the preservation of the group to which the individual belongs. (4) Adaptive instincts, which impel the individual to actions that develop him for reacting successfully to whatever situations he may meet. The chief ways in which instincts of this type manifest themselves are in the form of (*a*) play, (*b*) imitation, (*c*) curiosity. (5) Regulative instincts, whose function is to dominate and harmonize action so that reactions shall be less prompt and more consistent. These instincts, if instincts they be (their instinctive character is disputed), are manifested in two principal forms, (*a*) moral and (*b*) religious impulses, the first impelling to action in harmony with other persons and the second to acts in harmony with a superior power. The æsthetic instinct might be placed with these as being normative and to some extent regulative.

The first two classes of instincts, the individualistic and the parental, are of the same general character and strength in animal and in man, the third and fourth, the group and adaptive instincts, are much more prominent in man than in animals, while the last class, the regulative, are shown to only a very slight extent in even the highest animals. The biological value of these instincts in preserving life decreases for the different classes in the order named, while their intellectual value in developing the mind increases in the same order.

There are many instincts, such as teasing, collecting, constructing, expressing, that are the outgrowth of other instincts and contribute to several ends. Every instinct gives rise to emotions of a certain type, makes certain associated ideas prominent in consciousness, and impels to certain kinds of acts, even when those acts are deliberative rather than impulsive; hence they are important factors in emotional and volitional development as well as in intellectual. All of these instincts, except the parental, manifest themselves at an early age in children, but some are more prominent at certain ages than at others, and this is one of the chief reasons why children have different interests at different ages. Individual differences in children, not produced by external causes, are due to a large extent to the differences in the relative strength of the various instinctive tendencies as determined by heredity and by individual native endowment. Slight native differences lead to marked differences in later life, even when the child is subjected to nearly the same influences, because all the instincts are readily developed by exercise and may easily be associated with different types of acts. Weaker instincts are also suppressed or dominated by the stronger, hence, those that attain strength are extraordinarily powerful in determining character.

Stages of Development. — Many attempts have been made to arrange the development of human beings into stages or periods, but the stages shade into each other and their most prominent phases do not appear at the same time in different children. All naming of stages of development also necessarily emphasizes certain phases of development and partially or wholly ignores others. It is best to emphasize the more distinctly human characteristics, which are social and psychic, and trace the development of a conscious personality in response to a human environment. This gives us the following periods: (1) the objective and instinctive stage of the first year, in which social influences play a comparatively small part in the child's development and during which his behavior is quite comparable with that of animals. At the close of this period, he is inferior to animals in his movements, but superior in his intellectual development to any of the higher animals. (2) The imitative, socializing stage extends from 1 to 3 years of age. In this period the child comes through imitation and language to appreciate to some extent the mental states of others, and partially to differentiate his own personality from that of others. (3) The dramatizing, individualizing stage extends from 3 to 6. In this the child develops a very definite conscious individuality, frees himself from servile imitation, and begins to lead an independent conscious life. (4) The period of competitive socialization extends from 6 to 12. In this the child learns to live among those of his own age and to deal with them in order to attain his ends. He learns the simple social laws in the same way in which he earlier learned the physical laws governing the movements of objects. He is now greatly influenced not only by individuals, but, also, by the public sentiment of the group to which he belongs. Besides being introduced to a wider environment outside of the home, he also has brought to him, through the medium of books, the wider world environment. (5) The pubertal or early adolescent period extends from 12 to 18. During this the powerful race instinct becomes active, and under its influence a new attitude toward others, especially of the opposite sex, is produced; and a reorganized personality is developed after a period of more or less erratic behavior, similar to that marking the period immediately following the first emergence of a self-conscious personality. (6) The post-pubertal or later adolescent period extends from 18 to 24 or 30. In this the work of life begins; individuality is further developed, and personal habits of the adult are formed in the same general way as in the child between 6 and 12. The interests of each of these periods, especially the first two and the fifth, are determined in part by the inner laws of development, but the third, fourth, and sixth are more largely directed by outer influences. The common name given to the first two periods is infancy; the third and fourth periods comprise the childhood of the individual, while the fifth and sixth periods cover adolescence. (See ADOLESCENCE.)

Infancy. — Most of the biographical studies of children that have been made by parents and others include few, if any, observations beyond the first 3 years. The development after this age is so varied and complex that it is difficult to note its salient and significant features. The child is also less constantly in the presence of the observer, has an organized subjective life which is less adequately represented by objective movements than is that of younger children, and the changes in the relative prominence of the instincts are less rapid than at first, so that outer influences become prominent as compared with developmental changes, in making and modifying his mind and character. The development of children during the first 3 years is, therefore, much better and more accurately known than during the succeeding years.

Although no one can know the exact characteristics of an infant's consciousness at birth and during succeeding periods of development, opinions still differ greatly as to its nature and influence; yet during the whole period there are so many objective responses in the form of movements, and in the form of words during the second and third years, that objective facts may be collected in greater numbers and used in verifying and interpreting the observations made upon any particular child. The observations thus far made indicate that consciousness plays little part in directing the child's activities during the first three months. His movements are almost wholly of a reflex, instinctive, or chance character during this period, and only near its close has he attained sufficient control over his head and eyes to be able to look at things. During the next quarter year he obtains considerable control over his hands, so that he can reach for things and jerk them about. In the third quarter year he is able to move his whole body by creeping, hitching along, rolling over and over, and sometimes by walking while holding to something. In the last quarter of the first year he often learns to walk alone, and then can do a great many things previously impossible to him, with a certainty and accuracy that gradually increase. The most significant change is not, however, in any one kind of movement, but in the ability he gains to use many parts of the body in such a way as to accomplish now one end and now another.

The higher classes of instincts are present to only a slight extent during the first year, but many of them become prominent before the close of the third year. The child becomes playful and curious by the middle of the first year, and very imitative near its close. The social instinct develops rapidly during the second and third years, and, in close association with it, the expressive instinct. The child, under the influence of these two instincts and of the imitative tendency which is now dominant, rapidly learns to act, feel, think, and speak like those around him. At no period is the human environment so influential in determining the direction of instinctive development and in molding mind and character.

At 3 years of age the infant has become a human personality with considerable power of self-direction and with some individuality. He appears to have a consciousness of mental selves, and of his own as distinct from others. This is indicated by the correct use of pronouns, and in various other ways. This development of self-consciousness has been a gradual one. Its core or background is formed by (*a*) fairly constant bodily sensations, contrasted with the more variable special sensations, (*b*) persisting habits of reacting, and (*c*) memories as contrasted with present surroundings and activities. After he has learned to distinguish his own body from other things, it is some time before he distinguishes between his mental states and those of others. Mental states are to him common to himself and others. This period of common consciousness, in which he shares with others all their experiences and in which he wishes them to share in all that he perceives, is indicated (*a*) by his imitations, (*b*) by his insistence upon their seeing and hearing what he sees and hears, and (*c*) by his desire for their confirmation of the words he uses, and it precedes the development of self-consciousness, in which there is consciousness of the fact that his mental states are, in part, at least, not shared by others.

Childhood. — Very little has been done in the way of studying children between 3 and 6 years of age in a systematic or scientific way. Many interesting and amusing things regarding children of this age are reported, but beyond the fact that it is a period during which individuality develops rapidly, few general statements are justified by the facts that have been collected. The case is quite different for elementary school children of the ages from 6 to 14. They have been weighed, measured, tested, and questioned in great numbers and in a variety of ways according to methods that are more or less scientific. It is not possible, however, to state in brief form and with accuracy the general results of such studies. Most of the studies have been mass rather than individual studies, and in addition to the fact that individuals differ greatly in rate and order development in the same surroundings, and the fact that special external influences greatly modify development, there is still much uncertainty as to how far the special measurements, tests, and inquiries have been properly made, and if properly made how far the results indicate a typical development in the line of being tested. In general there is a gradual improvement in discrimination, motor control, rate of physical and mental activity, in mental grasp, and in memory. It is impossible to say how much of this improvement is due to incidental practice in doing the things that are tested or those that are similar. The curves obtained from such studies are usually irregular, and in all experimental studies as well as in other forms of statistical investigations there are very pronounced variations at about 12 years of age. This indicates that internal developmental changes are at this age great enough to modify those due to external influences, and that in some lines the two are in opposition and in others in harmony. The physical and mental changes during the next few years are numerous and profound, but it is impossible, from the statistical data at hand, to formulate accurate statements of the amount and character of the psychical changes. There are slight sex differences shown in all tests at nearly all ages until near the teens, when the differences become very marked. To what extent these differences are due to dress, occupation, and special teaching cannot be determined, but from this time on the children rapidly develop masculine and feminine characteristics.

Many studies based on observations and answers to questions, a large proportion of which throw light upon children's capacities, interests, and ideals at different ages, have been made. It appears that the ideas of small children are concerned chiefly with use and action and with specific concrete memories, while a little later, though still largely concerned with action and use, the ideas are more general in their form. The tendency toward a general form of ideas grows with age, as indicated by definitions that more and more give the larger class to which a thing belongs with descriptive terms that identify the class. Children are always interested in new experiences, and young children have this interest aroused more easily than the older, while the older, with a larger stock of ideas, are in a better condition for the excitation of apperceptive interest, which arises when new and old experiences are brought into relation.

Whatever a child does in play under the stimulus of the instincts that are prominent at the time is an indication of his interests. He is always interested in doing things, and in the early years of school life the mere doing is sufficient, but later the thing must not only represent, but must actually be of the same nature as what it imitates. Later in the higher grammar grades it must actually serve a useful purpose. At this time the child is more interested in school subjects because of some value he can see that they have than for their own sake. Hence much of the bookwork of the school fails to appeal to him. In literature stories of animals, fairies, and children are favored by the younger children in the order named, while older boys are interested in history and stories of adventure, and girls in romantic stories.

The ideals of children are at first personal and selected from their environment, but later they are influenced more by characters in history and literature. Their own national heroes usually have a prominent place in their thoughts, and girls often name men as ideal characters, while boys almost never mention women. Abstract ideals come later. (See Literature, Children's.) E. A. K.

See Adolescence ; Child Psychology ; Culture Epoch Theory ; Growth of the Child.

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CHILDHOOD, LEGISLATION FOR THE CONSERVATION AND PROTECTION OF. — The child and the rights of childhood have in a very full sense the protection of the law. In all civilized countries they are the object of much legislative concern. The proper registration of a child's birth, the legal safeguards thrown about its right to live, the attempts to reduce and restrict infant diseases and protect infant health, the prevention of cruelty from parents or others, the compulsory attendance of the child at school, its protection from premature employment, its right to suitable support from the State when not provided for by its parents, or when the latter are not living, its punishment for wrongdoing as of one in tutelage rather than as a criminal, all of these and many other aspects of child life and child welfare are dealt with in the legislation of all progressive countries. The purpose of all legislation relating directly to children is in the broadest sense the conservation of childhood and the protection of the foundation of the citizenship of the State. The children of a nation are its real capital and the modern State has come to realize that no capital investment brings a larger return than that which is put into the rearing of healthy, happy, and intelligent children.

Legislation always means an attempt to define and express rights which society is ready to recognize, guarantee, and make universal in their application. Among the more important rights of childhood that are now generally given legislative protection are: (1) The right to be well born. (2) The right to parental name, support, and protection. (3) The right to leisure, play, and recreation. (4) The right to education. (5) The right to exemption from work, until physically and mentally equipped for the specific tasks with which the work life may properly begin, and, for a longer period, the right to protection from any temptation to enter upon extra-hazardous or dangerous trades or to work under conditions inimical to health and morals. (6) The right to protection from inhumane treatment. (7) The right to protection of health and morals. (8) The right to a chance in a decent environment, both physical and social, when guilty of any infraction of the law.

Such rights are guaranteed for different age periods, and in many instances beyond the beginning of adolescence or even of adult life. The state has full power to legislate in any way it sees fit for minors during their minority, without any violation of the constitutional guarantees of individual liberty, and the present tendency is decidedly in the direction of extending the protective period to its full extent. In most American states, children between 2 and 16 may not be kept in almshouses when supported by the state, because the environment of an almshouse is not regarded as stimulating and helpful to growth. They may not work in some trades (dangerous and unhealthy) or at specified hours (night work) until 16, and in some cases, or for girls, until 18. Very recent legislation in New York has raised the protected age to 21 for the night messenger service, because of peculiar moral dangers. (See CHILD LABOR.) They may not buy liquor or frequent places where it is sold, or be sent to, or reside in, disorderly houses during their minority. It is now quite usual to provide a special court for the trial of juvenile offenders, and to sentence such as violate the law in graver offenses to separate institutions or reformatories apart from adult criminals, and also to extend the principle of parole and probation more liberally and generally to children of all ages. (See JUVENILE COURTS and JUVENILE PROBATION.)

England. — Recent English legislation for the protection and conservation of childhood will furnish the best model for our consideration, because it is the best codified and the most comprehensive law dealing with children and young persons. Nearly the entire English law concerning children can now be found in three great groups of statutes: (1) The Education Acts, 1870 to 1907. (2) The Factory and Workshop Act, 1901. The Agricultural Gangs Act, 1867. The Chimney Sweepers and Chimney Regulations Acts, 1840, 1864, 1875. The Coal Mines Regulation Act, 1887, 1896, 1900, 1905. (3) The Children Act, 1908.

The first group of acts deals with children at school and with respect to their educational rights and duties (see ATTENDANCE, COMPULSORY); the second group of acts deals with children at work (see CHILD LABOR), and the third, which is the most important and comprehensive piece of legislation on this subject attempted in any country up to the present time, seeks to bring together practically all of the other legislative enactments relating to children. It has been called the Children's Charter, and is divided into six parts, as follows: —

1. Infant Life Protection. This deals with the problems of baby farming, a subject first regulated by the Infant Life Protection Act, 1872, and again by an amending act, 1897, both of which proved ineffectual, and it seeks to protect the lives of infants put out to nurse. It requires notice to the local authority to be given by persons receiving infants under 7; it provides registration and inspection by the local authority, limits the number of infants to be kept in any one family, requires evidence of moral character, prohibits any insurable interest in the life of the child, and provides severe penalties for the enforcement of these regulations.

2. Cruelty to Children and Young Persons. This subject was first dealt with in the Prevention of Cruelty to and Protection of Children Act, 1889. Prior to that time cruelty to children was not an offense in any well defined sense. Some protection was had under the Poor Law and under minor provisions of other acts. The decisions of courts based on the common law had been variable and conflicting. The Prevention of Cruelty to Children Act, 1904, was made the basis for this section, and is still in force in part. Negligence as well as deliberate cruelty is now an offense, and it is made a criminal attempt to allow the child 4 to 16 to reside in or frequent a brothel, or to cause, encourage, or favor the seduction or prostitution of a girl under 16. Neglect of a child under 7 left in a room with an unguarded fire, if it causes loss of life or serious injury, and the overlaying of infants, which was shown to be the cause of death in London alone in 1600 cases annually, when due to drunkenness, is an indictable offense. Provision is made for the public inspection of private institutions for poor children, the inspectors to be women, where practicable, for institutions for girls, and to be of the same religious denomination, where practicable, for religious institutions. Wilful assault, neglect, ill treatment, abandonment, or exposure of a child (under 14) or young person (14 to 16 years of age), or being a party to conduct that causes unnecessary suffering or injury to the health of a child, constitutes a misdemeanor. The right of a parent or teacher, however, to administer punishment is expressly reserved.

3. Juvenile Smoking. The sale of tobacco to children under 16 is prohibited. Cigarettes, cigarette papers, or smoking mixtures used as substitutes for tobacco, when found in the possession of any person apparently under the age of 16, who is smoking in any street or public place, may be seized by the police or park keeper, and boys found smoking may be searched.

4. Reformatory and Industrial Schools.

5. Juvenile Offenders.

These two sections codify and amend a number of statutes enacted from 1854 to 1907. The commentators, Mr. Atherley Jones and Mr. Hugh L. Bellot, in their most useful and comprehensive treatise on *The Law of Children and Young Persons* (London, 1909), in speaking of this section of the Children Act say: " The result of the labors of the legislature over this statute is that now within a comparatively moderate compass may be found the main portion of the statute law which governs the relation of the child or young person to the state whenever the state may assume for long or short periods the control, custody, or guardianship of children or young persons, or provides penal measures against those parents or guardians who commit offenses against or are unfit to have the care of the young." A child 14 to 21 is fully responsible for criminal acts, but the English law, which has been quite conservative in permitting any special treatment of juvenile offenders, or any interference with the absolute rights of parents over children, has now been seriously modified in these particulars. Part IV of this Act now makes it possible to send truant children to industrial schools, and also permits Poor Law guardians to send refractory children to such schools, and parents and guardians may be required to contribute to the support of their children in such schools. The provisions for such schools and the laws governing them as well as reformatories are systematized, their proper inspection provided for, provision made for the boarding out of children, and even for their committal to the care of a relative or other fit person named by the court, provided they are placed under the supervision of a probation officer. This section also provides for the placing out on license of an offender or child to live with any trustworthy or respectable person as long as the conditions of the license are satisfied, and such time may be counted as part of the time of the child's detention in the school, and the managers of a school of this character may even go farther and apprentice or dispose of a child with his consent with the full powers of the parents in the premises. Neither a child nor young person, unless of depraved character, may be sent to prison, but must be detained in places provided, but not under the same regulations as prisons, and when charged with offenses in courts of summary jurisdiction, except when they are jointly charged with an adult, must be heard on different days from the ordinary sitting. Children's courts may be established in the metropolis. The death sentence may not be passed on any child or young person, but it may be sentenced to detention during his Majesty's pleasure, and on such conditions and in such place as the Secretary of State may direct when convicted of offenses for which the death sentence would be imposed on adults.

6. Miscellaneous and general provisions. The most important of these relate to vagrant children, and prohibit any one wandering from place to place with a child above the age of 5 unless exempt from school attendance or it is proven that it is not being deprived of efficient elementary education. It is also prohibited to purchase from a person apparently under the age of 16 any old metal, or to take an article in pawn from any person apparently under the age of 14. Children are excluded from the bars of licensed premises, and it is a punishable offense to give, or to cause to be given, to any child under 5 any intoxicating liquor, except on a physician's order. This section also contains a number of general definitions and the conditions of the applicability of the Act to Scotland and Ireland, as well as to England and Wales.

United States. — Legislation for children in the United States has not been systematized, nor does it proceed chiefly from any one source, as in the case of England. Except for alien immigrants, who come under the purview of federal legislation, we should have to collate the enactments of 46 state legislatures and several territorial legislatures in addition before we could speak of the American law for children. This has not been done, and indeed there are only incomplete attempts at the collection or systematic treatment of the laws relating to children in any single state. There is now pending before Congress a bill to create a Children's Bureau, which will do this very thing, as it is done in part already by the Bureau of Education for legislation concerning the school life of the child. (See McCrea, *The Humane Movement*, for summary of laws for child protection.)

Historically considered, legislation respecting childhood has its beginnings with dependent children for whom public support in some form is necessary. The English Poor Law, upon which our own is founded, had developed, as far back as the time of Queen Elizabeth, the theory of parental support, and held not only parents, but grandparents, responsible for their children or grandchildren; but institutions were early devised everywhere in this country for the care of foundlings and of abandoned, neglected, and destitute and dependent children. For the most part such children were cared for by the same officials and in the same institutions as adult paupers until public sentiment, aroused by the barbarities of such treatment, and calculating the cost to the State of the manufacture of paupers, and beginning to realize, dimly at first, the economic value of the child to the State, made its protest felt in legislation for the better care of dependent children. In 1874 both Michigan and New York made a radical move to deal with dependent children in almshouses; Michigan provided for a state school into which all dependent children eligible for public support were to be placed and from which they were to be put out as fast as practicable in private families. The parents were deprived of any legal rights to the child as soon as it was admitted to this school. New York prohibited children being kept in almshouses, and provided that they should be committed to an institution of the same religious persuasion as the parents, wherever practicable, the expenses to be paid by the county and the legal guardianship remaining with the parents. The various efforts in several states, and especially in the large cities, to care for destitute children during the early part of the nineteenth century are well summarized by Mr. Homer Folks in his monograph on *The Care of Destitute, Neglected and Delinquent Children.* (New York, 1902.)

"As to destitute children, the situation at the opening of the century [nineteenth] may, therefore, be summed up in the statement that children who were public charges were, as a rule, cared for with adult paupers by the contract system, or in almshouses or by out-door relief, or were bound out as apprentices; that Charleston had a municipal orphan asylum; and that private institutions for children had been established in New Orleans, Savannah, New York, Philadelphia, Baltimore, and Boston. As to neglected children, we find in the statutes of the time but few provisions for their rescue and care. As early as 1735, in Boston, children whose parents were unable or neglected to provide for their support and education, might be bound out by the overseers of the poor. The laws of Maryland authorized, in 1797, the binding out of children of beggars. The class of children who are now forcibly removed from the control of unfit parents apparently remained with their families, as a rule, until the latter became destitute, when the children were cared for as pauper children, or until the fruits of neglect were reaped, and the children, convicted of offenses, were sent to jails and penitentiaries along with older offenders."

Mr. Folks sums up the public systems of caring for destitute children, outside of almshouses, at the close of the nineteenth century, as follows: (*a*) The state school and placing out system adopted by Michigan, Minnesota, Wisconsin, Rhode Island, Kansas, Colorado, Nebraska, Montana, Nevada, and Texas. (*b*) The County Children's Home System, adopted by Connecticut, Ohio, and Indiana. (*c*) The plan of supporting public charges in private institutions which prevails in New York, California, Maryland, District of Columbia, and to some extent in several other states. (*d*) The boarding out and placing out system, which is carried on directly by the public authorities in Massachusetts, through a private organization — the Children's Aid Society — in Pennsylvania, and by the state authorities in New Jersey. This leaves a number of states without any general system except that of the Poor Law, although many of these, like Illinois, have good general statutes covering the subject of the custodial care of destitute, neglected, and delinquent children, and recognizing associations for the placing out of children, to whom powers are given to act as guardian, and bringing all such work under some public supervision such as that of the State Board of Charities. The state, rather than the county, system of care for dependent children is likely to prevail.

The White House Conference on the care of dependent children, which met in January, 1909, adopted unanimously resolutions which gave the broadest possible scope to legislation, and urged such as would bring about preventive work, having in view the reduction of the number of dependent children as well as their treatment and care. Emphasis was placed on the desirability of requiring incorporation, conditioned on the approval of a state board of charities, of all child-caring agencies, and forbidding all other than duly incorporated agencies to engage in the care of needy children. These resolutions also contained the following statements: " The proper training of destitute children being essential to the well-being of the state, it is a sound public policy that the state through its duly authorized representatives should inspect the work of all agencies which care for dependent children, whether by institutional or by home finding methods and whether supported by public or private funds. In order that this education may be equal to that afforded by the schools attended by the other children of the community, it is desired that the education of children in orphan asylums and other similar institutions, or those placed in families, should be under the supervision of the educational authorities of the state." Every child-caring agency should " exercise supervision over children under their care until such children are legally adopted, are returned to their parents, attain their majority, or are clearly beyond the need of further supervision. . . . We greatly deprecate the tendency of legislation in some states to place unnecessary obstacles in the way of placing children in family homes in such states by agencies whose headquarters are elsewhere, in view of the fact that we favor the care of destitute children, normal in mind and body, in families, whenever practicable." The above quotations from the Resolutions of the largest body of experts in child caring work ever assembled in this country, brought together by the invitation of the President of the United States, though without official recognition or authority, will serve to indicate present tendencies in public opinion and to point out the character of the legislation which has already been had in the more advanced states of the Union.

Next to the legislation which deals with dependency comes that which has to do with neglect, cruelty, and offenses against the person of the child. Such legislation came somewhat later in point of time. From 1790 to 1825 many statutes authorized children found begging to be bound out or committed to almshouses. New York, in 1833, provided that the mayor, recorder, two aldermen, or two special justices, might commit to the almshouse, or other suitable place for labor and instruction, any child found in a state of want or suffering or abandonment, or improperly exposed, or neglected by its parents or other person having the same in charge, or soliciting charities from door to door, or whose mother was a notoriously immoral woman; Massachusetts in 1866 provided for the commitment of children under 16 found under similar circumstances, and in 1882 provided for the commitment of neglected children between 3 and 16 years of age directly to the custody of the State Board of Charities. (See Folks, *op. cit.*, p. 169.)

Societies for the Prevention of Cruelty to Animals were started as early as 1866, eight years before similar societies for children were formed. The New York law of 1877, modeled on the Industrial School Act in England, and proposed by the New York Society for the Prevention of Cruelty to Children, laid the foundation for such legislation, which, through subsequent amendments, has given large powers to the Society and has been followed in other states where similar societies, also modeled on the New York organization, have been formed. (See article on HUMANE EDUCATION.)

Delinquent children have in recent years come in for the larger share of attention in all of our state legislation. Radical changes with a view to recognizing the independence of the child and the desirability of treating it both apart from the usual rules of procedure and punishment applicable to adult criminals and also with a view to holding the parent or guardian responsible for the wrongdoing of the child, as well as to secure better environmental conditions by removing it entirely from the custody of the parent, have found a place in the law of most states. (See article on JUVENILE DELINQUENTS, which includes a discussion of Juvenile Probation and Juvenile Courts.)

Health legislation has increasingly in recent years dealt with Infant Mortality and attempted to inaugurate preventive measures to bring under control the diseases of childhood. Thus the prevention of blindness, the proper feeding of infants, the regulation of infectious diseases, and other measures having particularly in view the protection of infancy are sought through provisions for departments of Child Hygiene, the registration of nurses or midwives, the instruction of mothers, and the better enforcement of sanitary regulations, for the most part brought about through municipal ordinances and appropriations. (See articles on: HYGIENE; HYGIENE, SCHOOL; NURSES, SCHOOL; DEFECTIVES, etc.)

Child Labor legislation, including the regulation of street trades, and the employment of children in theaters and in a great variety of occupations, in addition to their employment in factories and workshops, has thrown around the child, in most of our states, a very effective wall of protection. (See article on CHILD LABOR.) S. M. L.

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CHILDHOOD, STAGES OF. — See CHILD STUDY.

CHILDREN, CRIMINALITY IN. — Precocity in crime is held by some authorities to be one of the most alarming symptoms accompanying modern culture progress. President G. Stanley Hall (*Adolescence*, Vol. I, p. 324) cites as "two sad and significant facts," shown by statistics in all civilized lands: "First, that there is a marked increase of crime at the age of 12 to 14, not in crimes of one, but of all kinds, and that this increase continues for a number of years. . . . Second, that the proportion of juvenile delinquents seems to be everywhere increasing, and crime is more and more precocious." For America, in particular, most recent writers agree with Judge Lindsey, who furnishes the introduction to Travis' book on *The Young Malefactor*, in recognizing "the unquestioned increase of crime in this country," and, especially, of juvenile delinquency. One of the latest writers to discuss the general subject points out the rather unsatisfactory condition of statistics relating to juvenile crime, making it almost impossible to determine absolutely whether the last few years have indicated a diminution or an increase in such offenses. For France, Duprat (p. 48) seems to think that there has been, perhaps, a decrease in the sum total of minor delinquencies, but an increase in graver offenses, particularly those against persons, a view held by other authorities as well. The increase or decrease of criminality among children is, doubtless, more or less intimately connected with the fluctuations of crime among adults, which are so difficult to determine with any degree of accuracy.

In the history of the race, the limits of responsibility for "crime" committed before attaining the adult status have varied very much. Among many uncivilized and some civilized peoples, children under the age of puberty have been held altogether irresponsible for such actions. With some others the *patria potestas* was so great that there was no need to distinguish between offenses which angered or displeased the parent and those which might be termed "criminal." Up to 7 years of age the complete irresponsibility of children has been recognized by ancient Chinese, ancient Irish, modern English, Scotch, American law, etc.; and, as Westermarck (p. 265) points out, "the total or partial irresponsibility of childhood and early youth" is conceded in the laws of the civilized races of to-day. A qualified responsibility between 12 (and 14), or 16 (and 18) and 21 is sometimes admitted. The age of criminal responsibility begins in Italy and Spain with 9; in Austria, Portugal, and Russia with 10; in Germany with 12; in Sweden and Finland with 14. Special treatment for children between 7 and 14 in England, under 16 in France, between 12 and 18 in Germany, and for even higher ages in some other European countries, is also provided. The powers of judges, probation officers (*q.v.*), children's and juvenile courts (*q.v.*) in several of the states of the Union enable them to deal in entirely special fashion with children under 12, and often up to the age of 16, and a common recognition of 14 as such a limit seems to be well under way. Some of these provisions, however, are of quite recent origin, as may be seen from the history of crimes and their punishment in England in the eighteenth century, to say nothing of other civilized lands. There is noticeable an evident tendency to raise the age limit until it coincides more nearly with actual mental, individual responsibility of a clearly demonstrable kind.

Criminality in children is a perplexing problem for the scientific world of the twentieth century, as it was for the preceding ages of human mental evolution, exemplified in the development of the complexities of modern urban and rural life. The difficulty of accounting for it is evident, whether one looks into the folklore of the subject, representing the more or less naïve experiences of the mass of mankind in general, or examines the records of statistics and the results of scientific investigations in the most civilized countries on the globe.

The old theological doctrines of "original sin," "total depravity," "infant damnation," etc., found little difficulty in accounting for the criminal aspects and perversities of childhood, or in assigning to them fitting rebuke and appropriate chastisement. All human beings, as a result of the "sin of Adam," were "born not merely corrupt, but in a state of sin, guilt, and liability to punishment." On this basis it was easy to explain any anti-social tendencies and any evil-mindedness whatsoever on the part of children. The "old Adam" in them and in their parents accounted for all "crimes." The obsession of even very young children by Satan himself, or by some of his minions, was long believed in, and the resources of exorcism and punishment were taxed to the uttermost to remove the evil spirits or chastise the sinner. The Dark Ages of Christianity were filled with such actions toward children as are now happily impossible in even the most backward of civilized lands, and as never occurred, in all probability, in the most uncivilized.

Curiously enough, these theological doctrines, so inconsistent with the spirit of true religion, find a parallel in the history of the evolution of modern scientific thought in the prominence given by certain writers and investigators of the day to the theories of "atavism," and "recapitulation," that, in the extreme forms in which they are sometimes set forth, are possibly as far from being thoroughly scientific as the theological doctrines just referred to were from being genuinely religious. Not much is gained by substituting for the individual Adam and his weakness a primal human race pullulating with abnormal or defective physical and psychical characters which swarm periodically in the bodies and minds of all its individual descendants.

The literature of folklore and proverb, legends, and other material indicate how the lay mind of humanity has wavered with regard to the cause and the cure of crime. "Happy is the child whose father went to the devil," says one English proverb; and the belief is still widespread that the child of a clergyman runs every chance of turning out bad. But the investigations of Welldon prove how little there really is in the theory of clerics degenerating in their sons. For the Scotch saying, that "a daft nurse makes a wise wean," there are no convincing statistics. The "folk" has, in its various beliefs, interpreted heredity enough to show that it could be no out-and-out partisan of "atavism" or "recapitulation" pure and simple. The Japanese put the case for environment as strongly as possible, when they say "even the stones in the street are against the child of seven." And the pendulum of the thought of to-day seems swinging strongly in a like direction.

Some authorities regard the "crimes" of childhood as simply, or chiefly, "exaggerations of the characters which, in a less degree, mark nearly all children," and consider the child as being "naturally, by his organization, nearer to the animal, to the savage, to the criminal, than the adult" (Ellis, p. 212). They recognize a form of criminality almost peculiar to children, showing itself between the ages of 5 and 11, and being "characterized by a certain eccentricity of character, a dislike of family habits, an incapacity for education, a tendency to lying, together with astuteness and extraordinary cynicism, bad sexual habits, and cruelty toward animals and companions" (Ellis). With some children, the exaggerated appearance of these characters is noted only in connection with the pubertal crisis, to which so much importance has been attached by

Marro, Hall, and other recent authorities and investigators. President Hall, indeed, seems willing to account for some of the peculiarities of character in children under 8 by the hypothesis of "a prehistoric early (sexual) ripeness in some pigmoid stage" (*Adolescence*, Vol. II, p. 103), thus making racial sex experience a factor at this early stage in the life of the individual. The proof of this, however, is not forthcoming; and the less sex is appealed to in explanation of the phenomena of childhood the better, — all other possible interpretations should be attempted first. Many of the sexual "crimes" of childhood are due to the influence and suggestion of their elders (older brothers and sisters, companions, nurses, parents, etc.), and are rarely naïvely childish or childlike.

The evanescent nature and transient character of many of the "faults," "wrongdoings," and even "crimes" of children are indicated by both the verdict of folklore and the results of scientific inquiries. Some of the mental and moral obliquities and abnormalities that "afflict" the child come and go, apparently, with no more effect upon the subsequent life of the individual man or woman than that exerted by certain merely physical and somatic peculiarities of an equally ephemeral nature. But this transiency can easily be magnified beyond its proper scope. It is going too far, *e.g.*, to hold, as do some recent writers, that every child passes through a "criminal stage," normal to it at that period of development. It is just as unscientific to call every child a criminal, as it is to call every criminal a child. The parallel, often set up, between the child and the criminal, though quite taking in points, is really very ineffective, as must necessarily be all such *rapprochements* in which one party is a grown-up and the other a very young human being. Here, perhaps, more than anywhere else, it should be remembered that a child is a child, and a man is a man. Adulthood always brings with it something *sui generis*, and childhood retains to the end a certain autonomy of its own.

To distinguish between these "transient phenomena," which, in passing, leave the child practically normal, and those others, which, by their permanence and intensity later on, show themselves to have been built up on a firm foundation, or to have had some constantly advantageous feeding ground, is by no means easy in the present condition of our knowledge of the causes and the stimuli of crime. It is easy to confuse, for example, morbid impulses and actions of adults, explainable from an adult psychosis, and, as Havelock Ellis remarks (p. 213), "perhaps more closely related to insanity than to criminality," with phenomena of child life having a certain resemblance to them, and interpret such as "impulses of childhood persisting in a more or less subdued form in adult age." An adult with retention of "child impulses" must, however, differ from one whose criminal tendencies and actions are motivated by adultism altogether. It is more correct to speak of "child aspects" of the adult criminal than to term him a child.

It has been said that good people are those who have in some way or other sloughed off their criminal tendencies; that "if everyone had his deserts, all would be in jail." This last statement is more witty than truthful, and serves rather as an index of human injustice than as throwing any light upon the origin of criminality in young children. That there has been no identity of reaction to crime among children in the same race, people, community, or even family, and, furthermore, no identity in the treatment of such criminal phenomena is an undisputed fact. This means that sometimes the "crimes" of the child have gone unpunished or unrebuked, while sometimes they have been sternly repressed, and, where possible, extinguished. Class and social differences have undoubtedly been of effect here, especially in those countries where aristocratic and other like distinctions have long survived in great strength. The privileges and immunities from punishments allowed to schoolboys and students at educational institutions both in the Old World and in America, as against corresponding age-classes elsewhere in the communities in which they reside, are one notorious example of injustice in the matter of "crime" among young people. If the overlooking and excusing of offenses here is justifiable at all, it ought to be, in a democracy at least, without favor to class, nationality, etc. The process of education should not be made a promoter of such prejudiced *katharsis.* There has been also a decided discrimination in favor of the male sex here, as elsewhere in society, for the "crimes" of boys have been condoned and overlooked to a much more serious extent than those of girls. For this reason, statistics make out girls to be, at certain ages, rather more "criminal" than boys, *i.e.* they were not so well shielded and excused. Mayhew, who wrote about the prisons of London in 1862 (see Ellis, p. 213), said, in reference to the "crimes" for which boys were incarcerated at Tothill Fields: "For ourselves, we will frankly confess, that, at Westminster school, where we passed some 7 years of our boyhood, such acts were daily perpetrated; and yet, if the scholars had been sent to the house of correction, instead of Oxford or Cambridge, to complete their education, the country would now have seen many of our playmates working among the convicts in the dockyards rather than lending dignity to the senate or honor to the bench." Judge Lindsey puts the case for America quite as strongly (see Travis, p. xii): "If a hundred average schoolboys could, under the same condition, be subjected to precisely the same temptation faced by the boy who took the pocketbook from his neighbor's kitchen, when he believed no one saw his act, and that he would not be detected, only God knows how many out of the hundred would not have acted in precisely the same way." These statements are thought to be valid, with regard not merely to the acts of violence, and offenses against the social order, committed by the young, but also the phenomena of lying and kindred actions. Those who take this view of the matter overestimate the suggestion of the environment and the "weakness" of the individual, and underestimate the possibilities of the early appearance of at least the elements of temperament and character which are often noticeably present among primitive peoples. All the investigations of "children's lies" and the facts adduced by the rapidly increasing literature concerning the nature of the testimony of children (the *Aussage* data of Meumann, Stern, etc.), while serving to bring out many interesting classifications of children's lies and much new material concerning the behavior of children, while under adult influence and suggestion, have not accounted for the remarkable fact, admitted by the best students of the child, that up to the age of 5 there is practically an entire absence of deliberate lying, — the period of lying proper beginning not before this. The advocates of "recapitulation" might score a point here by calling attention to the notable truthfulness of certain primitive peoples, such, *e.g.*, as the unspoiled Veddas of Ceylon, etc. Those who have resorted to "imagination" as the source of children's lying, while successful in certain directions, have rather overdone the matter, as so many cases of an early perception of the difference between "the *real* real" and "the *make-believe* real," on the part of quite young children, seem to indicate. The utterly false is also often very early distinguished.

The cruelty of children (La Fontaine said of childhood, "this age is pitiless") is ascribed by Compayré to ignorance, — "the child is a Cartesian without knowing it, and makes no distinction between his Punch and his dog"; by others to atavism, recapitulation of racial history, etc., or to "psychic rudimentary organs." Havelock Ellis (p. 130) holds that "a certain amount of cruelty is, however, almost normal in healthy children," and President Hall (*Adolescence*, Vol. I, p. 359), thinks that "the child torturer is only an extreme and abnormal development from the arrant teaser." To explain the cruelty of children as an inheritance from primitive ancestors is not at all satisfactory, since many primitive peoples are no more cruel than the civilized peoples of the globe, and some of them certainly less so. The presumption that early man was a sort of ferocious beast, from whose inhumanities all the aberrations and degeneracies of the child are to be accounted for, is a theory rejected by the newer anthropology. It is interesting to cite, at this point, what Kidd (*Savage Childhood*, pp. 107, 195) says, concerning cruelty among the children of the South African Kaffirs: "At the age of 4 or 5 the child often develops a strong lust for killing animals or insects, and rivals the proverbial Englishman in *Punch*. At this stage, there seems to be no definite development of cruelty, for the rage is an obsession, and the child is not deliberately cruel. This sudden outburst seems to be some temporary efflorescence and soon passes off. Deliberate cruelty is developed at a later period." In spitting caterpillars and roasting them over the fire these children are not intentionally cruel, any more than is the American adult devotee of broiled live lobster. Nor, as Kidd again observes, "is there necessarily any intentional cruelty when these children pull off the wings and legs of insects; they do it half unwittingly, wondering what sort of blood the insects have, and being amused to see how they hop with only one leg." As to deliberate cruelty among Kaffir children, we are informed: "But there is deliberate cruelty in the way they torture some insects and animals which they think hurt men and women. They often choose a harmless lizard, under a mistaken idea that it stings human beings; they slowly torture it to death, talking to it all the time, and telling it that it deserves to suffer because it is an enemy of man. Sometimes parents stop boys from doing this, but often they pay no heed to what the boys are doing." One sees from this, how little savage children differ sometimes from those of cultured races. The picture drawn by Kidd might, indeed, stand almost for our own day and generation. The reason given for the "deliberate cruelty" is also not unknown among us. The writer of this article has observed cases of stimulation to cruelty of this sort in the wake of the "nature study" denunciation of the English sparrow and the hygienic onslaught of adults upon the pestiferous house fly. It is hard to say how much of children's cruelty to animals and insects springs chiefly from such sources. Their immediate, rather than their remote, ancestors are certainly responsible for a good deal. This fact is important when one considers how large a part of the criminality of children is practically a matter of cruelty. As noted by Kidd, with respect to Kaffir children and animals, some of the major crimes of the children of civilized races, including even certain homicides, are motivated by the idea that the victim has injured in some way or other the parents and friends of the child in question, — a parallel to the case of the Kaffir child and the lizard. Instances are not wanting where children under eight or nine years of age have rushed to the defense of the mother, or some other close friend, with the exclamation, "I'd like to kill you!" Here we may meet with a proto-altruistic motive and perhaps also a pseudo-altruistic one. Many of the assaults and kindred expressions of violence on the part of children are susceptible of a like explanation. The deliberate, studied cruelty of adults, savage and civilized, is of another order and not germane to childhood.

As little as the cruelty and wild outbursts of violence noted in certain children, can some of the other " criminal phenomena " of this age of the individual be accounted for by mere reference to the history of the race. In view of what is known of such uncivilized peoples as the Veddas of Ceylon, some of the milder and gentler tribes of American Indians, the Mentawei Islanders of Sumatra, and others, it is impossible to interpret lying, cynicism, sexual immorality, theft, pyromania, truancy, resistance to family life, selfishness, cunning, and all their manifold ramifications as simply phenomena of ontogenetic recapitulation of phylogenetic experiences. President Hall and his immediate school go, perhaps, as much too far in this direction as does Judge Lindsey in another, when the latter declares (Travis, p. x), that " at least 95 per cent of children who are dealt with as delinquents are no different from the average child, but are such because their environment is different," and that " juvenile delinquency pertains to *all* children, for all children are delinquent at some time or other." One school of observers makes altogether too large a draft upon heredity, near and remote, another too large a draft upon environment and the individual's own contact with it. Children, like other humans, are both born and made, and there is something even in childhood that is the forerunner of personality, and must be given some rôle in the interpretation of the facts. Even a little girl of 4 or 5 has been heard to say, " I'm not like anybody else; I'm just like my own self." This early " selfhood " is discernible in the abnormal as well as in the normal phenomena of childhood. The element of self-rivalry and self-emulation must also be taken into account.

Suicide is one of the aspects of " crime " among children that is thought to have increased perceptibly with the progress of modern civilization, having been influenced much by the stress of school life, disappointment at the result of examinations, and other similar causes connected with wounded self-feelings, etc. Both in Germany and in America this fact has been brought out, particularly in the last few years. In France, since 1899, according to Proal (p. 3), there has been a slight tendency toward decrease in child suicides, accompanying a similar movement in the suicides of adults. In France, in 1839, out of a total of 2752 suicides, 20 were those of children under 16 years of age, and 132 those of individuals between 16 and 21; in 1904 the figures were, respectively, 8876, 52, and 429. In pathological cases, heredity and alcoholism are assigned the chief rôles, but in nonpathological cases the same sense of " wounded self," so potent in adult acts of self-destruction, is marked in childhood and in youth. Homicides by children are, in not a few instances, due to similar causes, as are likewise many minor offenses and delinquencies more or less directly connected with systems of education.

Alcoholism in children is a phenomenon occurring with surprising frequency in certain regions of Europe and America, as a part of the general alcohol " debauch " of some modern civilized races, rather than a harking back to prehistoric times. Of the many institutions and other devices for preventing juvenile crime and helping or reforming young criminals and delinquents, — reformatory and industrial schools (*q.v.*), placing out agencies, the Borstal system, probation officers (*q.v.*), children's and juvenile courts (*q.v.*), guardianship-education, emigration, children's colonies, George Junior Republic (*q.v.*), boys' and girls' clubs (*q.v.*), — some seem to succeed in certain countries much better than in others, being evidently more in touch with the racial, national, historical, and environmental experience. A method equally effective for English, French, German, Italian, and Slavonic children has not yet been wrought out, although the composite nature of the child population of America almost makes some such expedient necessary. The reasonable success of the " junior republic " points in this direction; also some of the playground and open-air establishments. Children's courts and the probation system, while not uniformly as successful as could be wished, are of great promise. Complete change of environment, with new and lasting family life, is likewise productive of much good. Indeed, whatever can create a home environment, or something closely approximating to it, must be beneficial, as it is the most human method of " reform " or " regeneration." In America, much emphasis has been laid upon more or less thorough change of environment, influence of strong personalities (judge and other adults) in the home. Judge Lindsey claims to have cured 96 per cent of all delinquent boys coming before the Juvenile Court at Denver, Col., a result more favorable than reported for the George Junior Republic, or any other known reformatory institution (here the figures are generally, both in America and in Europe, very much lower). The statistics of " reform," however, have not yet been subjected to the keen analysis which they must undergo before they can be taken as undoubted evidence of success. Details also as to special offenses and particular " crimes " are still rather unsatisfactory. This aspect of the subject will be considered in the article on EDUCATION AND CRIME (*q.v.*). A. F. C.

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CHILDREN'S LITERATURE. — See Literature, Children's.

CHILE, EDUCATION IN. — Chile: Republic comprising 23 provinces; area 307,620 square miles; population (census of 1905), 3,399,928.

Historical. — European customs and institutions were originally introduced into Chile, as into other divisions of South America, by Spanish forces from Peru bent upon extending the royal dominion in the New World. When permanent settlements were formed the ecclesiastics and teaching orders of the Roman Catholic Church, who followed the Spanish flag, entered upon the task of proselyting and instructing the natives and of maintaining spiritual and intellectual control over the Spaniards themselves. But the spirit of liberty which in the latter half of the eighteenth century arose in the distant possessions of Spain soon manifested itself in Chile. Stimulated by the successful revolution in the province of La Plata, the Chilean patriots threw off the Spanish yoke in 1810 and organized a provisional government. A period of struggles, anarchy, and internal dissensions followed, and it was not until 1833 that the present constitution was adopted, and Chile entered upon an era of stable government and remarkable prosperity.

The leaders of the new republic manifested an interest in the cause of public education scarcely less than that which animated the leaders of the Argentine Republic. The constitution declared the matter to be one of supreme importance, a ministry of public instruction was created in the government, and measures were at once adopted for the promotion and regulation of secondary and higher education. The importance of primary education was emphasized by the establishment at Santiago, in 1842, of a normal school for training primary teachers, and in 1860 the organic law of primary instruction was passed. The system of administration adopted in Chile differs radically from that of the sister republic. The control of public education in all its branches is centralized in the ministry and its support provided from the national treasury. The teachers of public schools are appointed and their salaries paid by the central authority, and the school organization, scheme of studies, etc., are controlled by official regulations emanating from the same source. As a consequence there is little interest in primary schools on the part of local authorities or on the part of the people in general. But, on the other hand, many influences, in particular the spirit of clerical teachers and of an aristocratic society, have fostered the type of education which in Europe has long been the privilege of the directive classes. These distinctions are reflected in the administration of the system of public instruction in two independent sections.

Primary Education. — Primary schools, normal schools, and industrial schools are under the control of an Inspector-General who is subordinate only to the minister. The recent efforts for the improvement of this service were inspired by the educational congress and exhibit held at Santiago in 1902. The low state of primary education was the chief topic of discussion in the congress, and its relation to industrial skill was emphasized by the exhibits from foreign nations. The interest thus excited was indicated by the marked increase in the number of public primary schools, in efforts for the improvement of the teaching service, and larger provision for manual training. The official statistics show for 1902 a total of 1821 public primary schools, with an enrollment of 145,052 pupils; in 1907 the totals were 2319 schools and 197,174 pupils. Of the 3977 teachers employed in the latter year only 1415, a little more than one third, had been trained in the normal schools. The importance of such preparation was emphasized by arrangements for the professional instruction of the untrained teachers in order that they might pass the government examinations and obtain diplomas as qualified teachers. Furthermore, by a decree of March 25, 1908, appointments to the directorship of higher grade primary schools were limited to normal graduates who should successfully pass a competitive examination conducted by a government board. The solicitude of the government in regard to popular education was also shown by an increase in the subsidies granted to private primary schools. In 1898 the amount allowed for this purpose was $49,490; in 1907 it was $232,286; or $16.70 per capita of the average attendance (13,898 pupils). In his report for 1908 the Minister of Public Instruction, while admitting that under present conditions private (chiefly parochial) schools must be recognized, insists that government aid to the same should not be granted without careful examination; in accordance with the minister's recommendation, an ordinance was issued requiring, as conditions for sharing in the subsidy, that the hygienic surroundings of the schools shall be good; that the teachers shall have diplomas from the normal schools, or have bachelors' degrees in the humanities, or shall pass examinations; that reading, writing, elementary arithmetic, geography and history of Chile be taught; that the schools shall be in operation at least 150 days in the year, and that they shall be subject to inspection by the regular inspector of the public schools.

At the opening session of the educational congress of 1902, the Chilean Minister of Public Instruction, Señor Don Rivera, dwelt upon the importance of technical knowledge and skill in the new activities of modern life. The subject was prominent in the discussions of the congress, and a new impulse was given to the provision for manual and technical training which had already been started in the country. In 1899, 10 carpenter shops had been established in connection with primary schools; in 1907 there were 29 carpenter shops, with 908 pupils working in them, 40 shops for working in pasteboard, with 1270 pupils, and 51 shops for needlework, with 5100 girls in them. It was proposed that year to introduce training in trades in the higher primary schools. A special decree of April 27, 1908, provided that candidates who have completed the course of the Pedagogical Institute and those who have studied at the Institute of Physical and Manual Training are to be preferred as teachers in normal schools, and if such candidates are not available, then those who have diplomas as teachers in normal schools or university graduates will be accepted, thus precluding the possibility of filling the positions with unqualified persons.

The purpose of the government to employ only trained teachers in the primary schools is seriously hindered by the want of sufficient normal schools, and further by the low salaries, which offer little inducement to ambitious young people to prepare themselves for the service. In 1907 there were only 15 normal schools (6 for men, 9 for women), with a registration of 1977 students (722 men, 1255 women); the number of graduates was 120, of whom 66 were men and 54 women. A new normal school for women has been opened since 1908, and other schools of the same class are contemplated.

The primary school teachers are graded in four classes, with annual salaries rising from a minimum of 960 *pesos* ($240) to 1800 *pesos* ($450). After 10 years of service the teacher in any class is entitled to an increase of 20 per cent. Assistants are paid on a lower scale, beginning at $180 and rising to a maximum of $300.

The industrial advance of the country and the rising wage scale, even for unskilled labor, make an increase in teachers' salaries an imperative necessity. It is recognized that the central government alone is unequal to the emergency that has arisen. The annual appropriation for the entire service, including normal schools, is about $2,250,000, but this amount is not devoted solely to current expenditures. A system of local school taxation is strongly urged as essential to that extension of primary education which the public welfare requires.

Secondary and Higher Education. — Although secondary schools (*liceos*) and higher institutions were established by decrees issued in the earliest years of the Republic, the system of secondary and higher education in Chile was not organized until the passage of the law of Jan. 9, 1879. This law provided that there should be at least one public secondary school in each province of the country, institutions of higher education "necessary for the practice of the scientific and literary professions," and special schools to prepare students for the public service and for the conduct of mechanical and industrial enterprises, all maintained by public funds. The immediate charge of these establishments was committed to the national Council of Education, consisting of the Minister of Public Instruction (presiding officer); the rector of the university; the deans of the university faculties; the rector of the National Institute; three members appointed by the President of the republic, and two members elected by the university faculties.

The union of secondary and higher education in one department follows scholastic traditions which were perpetuated in the university system devised by Napoleon. The principal features of this system have not only survived to the present day in France, but also in the systems of education of the Latin countries generally, which follow French precedents. The Council prescribes the courses of study, the number and qualifications of the professors, and all details pertaining to the conduct of the institutions under its direction. In the scholastic scheme, the term "secondary" implies a course of instruction, intended to educate the directive classes for their rôle in the social order, and at the same time to furnish a suitable preparation for the professional courses of instruction offered in the universities. The courses of study in the *liceos* are officially designated as "preparatory" and the "humanities," the latter including modern languages, mathematics, physics, and natural sciences, to which the new studies of civics, psychology, philosophy of the sciences, and general history of civilization have been recently added. In the full-course *liceos* the program of studies is arranged to cover 6 years.

From the beginning the effort was made by the Chilean government to avoid the excessive literary tendencies of the older schools and impart to the new institutions a more scientific character. With this purpose in view, the *Instituto Pedagogico* was founded in 1813 for the training of teachers for the *liceos.* Professors were invited from Germany to form the faculty of the institution, and as a result modern secondary education in the country has been developed under German influences. The Institute has become in fact a university school of education intended to prepare special professors for the several branches of the secondary course. The curriculum is therefore divided into seven distinct sections: (1) Spanish, (2) French, (3) English, (4) German, (5) history and geography, (6) mathematics and physics, (7) biology, chemistry, and mineralogy. All students are required to take pedagogy, experimental psychology, logic, ethics, the history of philosophy, civics, and educational organization and legislation. The full course covers a period of 4 years. At the beginning only young men were admitted to the Institute, but later it was made coeducational, and thus its influence was extended to the public *liceos* for young women, which are rapidly increasing in number and prestige.

There are at present 39 *liceos* for young men, with an enrollment of 9302 students, and an average attendance of about 7900; and 31 *liceos* for young women, with 4810 students, and an average attendance of 3800. The number of students in the course of humanities, or true secondary course, in 1908, was 6334, of whom 4555 were young men. The private secondary schools, which have a still larger attendance than the *liceos,* are in a measure under government supervision, as the greater number receive public subsidies. They, also, follow the official programs, since, like the *liceos,* they prepare students for the university examinations. Hence the whole province of secondary education in Chile is permeated with the modern spirit.

The provision for secondary education is completed by special technical schools, which are of recent origin, but have already assumed great importance in the industrial and business world. The principal schools of this class are the commercial school of Santiago, established in 1908 by a group of public-spirited citizens. It was provided with a new building by the national government, which also makes an annual appropriation toward its support. Similar schools have since been opened in Valparaiso, Concepción, and other cities. These schools, which are intended for students from 12 to 15 years of age, represent the first stage of a system of commercial education. The school of mechanical arts, situated at Santiago, bears the same relation to industrial education. To this school pupils are sent from all parts of the country, and the success of its graduates makes it certain that similar institutions will soon be provided in all the large towns of the republic. Santiago has also led in the provision for the industrial training of girls by the establishment of a school in which the trades open to women, *i.e.* dressmaking and hat making, are taught, as well as bookkeeping, stenography, etc. In all the special schools named the courses are eminently practical and are in charge of competent teachers. Numerous private societies, both secular and clerical, have been active in promoting industrial and technical training as an indispensable part of national education.

Higher Education. — Higher education centers in the University of Chile, inaugurated at Santiago Sept. 17, 1843. By its representation in the Council of Public Instruction the university bears an important part in shaping the entire course of education in the country. As stated by the Minister in his report for 1908, it has not only been the fountain of instruction and learning as such, but has been the source of the progressive ideas in educational reform, which have so rapidly modified the intellectual condition of the people in recent years. The Council of Public Instruction is charged with the duty of conferring degrees and titles which qualify the student to practice professions or enter the public service, and has provided a series of examinations as a condition precedent to granting the degrees. The degree of Bachelor of the Humanities is evidence that the student possesses all the ideas which are indispensable to a man of culture and a good citizen. The degree of Licentiate in law or medicine or mathematics (engineering) is clear proof not only that its possessor is qualified to practice the corresponding profession, but it also implies that he knows, and knows well, other subjects of study which, although they may not be necessary in the practice of his profession, yet give him breadth of view and fixed principles.

Up to a very recent date the members of the university faculties have been professional men engaged to deliver lectures before the students. This system has secured the interest and coöperation of the principal lawyers, doctors, engineers, etc., of Santiago, but it has deprived the university of organic unity. Serious efforts were made by the former rector of the university, Dr. Valentin Letelier, to develop the conditions of institutional life, by the provision of permanent professors and a central building, or clubhouse, for the students. In the transformation which is gradually taking place, the lecture system will, it is believed, be replaced by class instruction, practical exercises, and close relations between students and professors. It should be observed, however, that a degree of organic unity has always been maintained through the agency of the Council, a permanent directive body of which the university rector is president. The progressive spirit of the Council is indicated by the establishment in 1907 of a special class for the study of the exploitation of saltpeter and analogous salts, in view of the great importance of the saltpeter industry to Chile. Another new chair in the mathematical course is that of seismology and seismic architecture, suggested particularly by the earthquake of 1906. The services of Professor Montessus de Ballore were secured to fill this chair and to erect and superintend a seismological observatory. The astronomical observatory of Santiago and the museums of natural history of Santiago, Valparaiso, and Concepción, and a botanical garden are connected more or less directly with the university faculty of physical sciences and mathematics.

The Council contributes to the general education of the people through its own publications, such as the *Anales de la Universidad*, and by publishing other important works and awarding prizes. The following table indicates the status of the university in 1908: —

INSTRUCTORS, STUDENTS, AND BUDGET OF THE DIFFERENT FACULTIES OF THE UNIVERSITY OF CHILE

FACULTY	INSTRUCTING CORPS	STUDENTS	BUDGET
Law and social sciences (including special course in city of Concepción)	44	491	$21,000
Medicine and pharmacy, and nurses' training school	32	294	55,360
Dentistry	5	89	8,800
Engineering	19	149	29,646
Architecture	15	43	12,075
Pedagogy	12	221	26,983
Fine Arts	11	135	7,530
Total	138	1,422	$161,394

The provision for higher education in Chile is completed by the Catholic University at Santiago, founded in 1888. In 1908 the registration of students was as follows: law school, 185; engineering school, 396; the agricultural school, 12; and the school of fine arts, 55. In all of these departments the equipment is excellent, and the teaching corps has been selected with great care. The Catholic University is supported by the wealthier classes of Chile, whose donations and bequests to the institution reach a large total each year. As the degree-conferring powers in Chile are confided exclusively to the national Council, the graduates of the Catholic University must meet the requirements of this body for the final sanction of their studies.

The Spanish-American countries, following the Latin traditions, maintain schools of art and music as public institutions supported by the State. The studies of the schools of fine arts in Chile include painting, drawing, sculpture, engraving, and architecture, and the teachers are often European artists who have received prizes for their work in Paris or Spain. There were 243 pupils of both sexes at the two schools of fine and decorative art in 1907, and 144 male and 439 female students at the national conservatory of music. This institution is of great benefit to the middle class of the population, since the greater part of its graduates become teachers of the piano and singing, and are also, if their talents suffice, trained as dramatic and lyric artists. The importance of art as an elevating influence in national life is emphasized in Chile at the present time by an international exposition of fine arts, which was held at Santiago, September, 1910, as a part of the Chilean centennial celebration. On the opening day, Sept. 18, the Palace of Fine Arts, erected as a permanent memorial of the occasion, was inaugurated.

A. T. S. AND R. L. P.

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CHILE, UNIVERSITY OF. — See CHILE, EDUCATION IN.

CHILPERIC I. — Son of King Clothaire; reigned over the Franks from 561 to 584. His rule was rendered precarious by a long strife with his brothers, particularly Sigebert. The assassination of Sigebert in 575 left Chilperic with the King of Burgundy, Gontran, as his chief opponent. In the field of education, it is to be noted that Chilperic had ambitions similar to those which Charlemagne was later more successfully to realize. He extended the royal authority against the claims of the bishops, was interested in theology and logic, wrote Latin verses in a dark age when literature was almost unknown, and, not satisfied with these essays, attempted even to add certain letters to the Roman alphabet. At the same time, he is described by his contemporary and victim, Gregory of Tours, as cruel and vindictive, the Nero and Herod of the times.

P. R. C.

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CHINA, EDUCATION IN. — Nothing that one could say would express so concisely the beginnings of the education of Chinese children as a few quotations from their little classics for boys and girls. It is urged upon every woman that she should : —

Of pre-natal education
Be attentive as a mother.
For the influence is mutual of each upon the other.
Whether walking, standing, sitting, or reclining, have a rule,
E'en in eating and in drinking have a care yourself to school.

In its babyhood the prattling infant is taught rhymes similar to those of our own nursery, when the mother, the nurse, or the elder brothers or sisters take hold of its fingers one by one while they repeat: —

This one's old,
This one's young,
This one has no meat,
This one's gone
To buy some hay,
And this one's on the street.

Boys and girls are allowed to play together until they are 7 or 8 years of age, when

For her son she calls a teacher and she places him in school,
Where he learns to write short ballads, studies how to be discreet,
Loves his teacher and rewards him both with money and with meat.

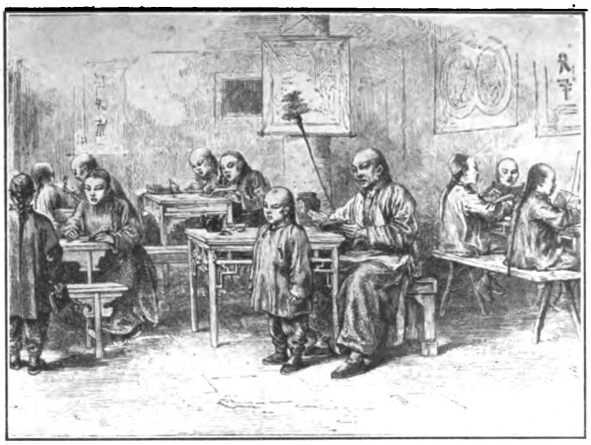
The pupil commits to memory, line by line, four primers: *The Three Character Classic*, *The Thousand Character Classic*, *The Hundred Surnames*, and *The Rules of Behavior*, none of which he understands at the time, as they are written in the classical language, which is to the vernacular what Latin was to English 150 years ago. In reciting, he stands with his back to the teacher that he may not "cast sly glances" at the book. After these are all "memorized" they are "explained" by the teacher, then by the child, and from these primers he has obtained the foundation of all Chinese history, philosophy, and social rules, with every proper name that he will ever come across in books, and is able to recognize not less than three to four thousand ideographs. When he began memorizing, to impress the characters more indelibly upon his mind, he began copying them with a Chinese brush (pen) by laying a sheet of translucent paper over the copy.

When these are completed, he is given a school name and enters upon the study of the Four Books — *Confucian Analects*, *Great Learning*, *Doctrine of the Mean*, and *Mencius* — committing them to memory, and " backing " them to the teacher as he did the primers. While he is committing the second, the teacher explains the first; while the third is being committed, he explains the second, and so on, giving the pupil a thorough review, and impressing them upon his mind so firmly that during his whole life he is able to quote verbatim any sentence the books contain. His examinations consist in being given catch words by the teacher or examiner, from which he is expected to complete the sentences, the meaning of any of which he may be asked to explain. All the while he continues writing, and begins original composition both in prose and verse, though the chief object of his study is to get words at his tongue's end and characters at his pencil's point.

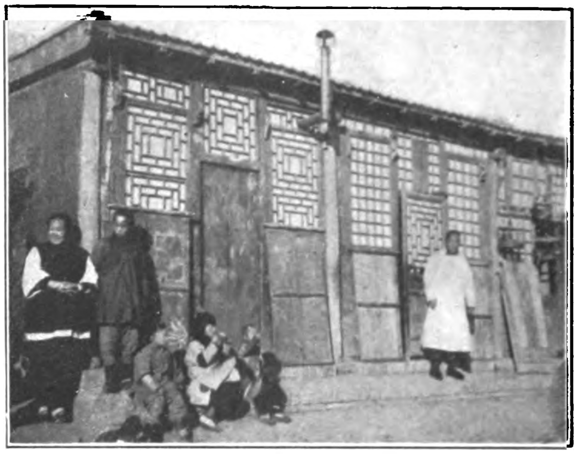
The school in which he studies may be a room in his father's house, a select school for boys, or a public school in the city, to which he has been admitted (if there be a vacancy), after passing the required examination. No matter where the school is, or what its character or grade, the furniture is always the same, — high, plain, oblong tables, at which he must sit straight, on hard, flat chairs or benches, without any depressions to adapt them to the curves of the body. On these he sits day after day, and year after year, his head and body swaying to the rhythm of the book, which he studies aloud, in a singsong tone, that the teacher may know that he is intent upon his work. And the teacher's ear is so well trained that, though he may have twenty or thirty boys all studying aloud at the same time, he is able to detect every mispronunciation made by any one of them.

When he has completed the Four Books, he continues, without a break, with the Five Classics, *The Spring and Autumn*, and thé Books of *Poetry*, *History*, *Rites*, and *Changes*. All of these are committed to memory, in regular order, one being memorized while another is explained, until his entire bible is at his tongue's end, together with the commentary thereof. With the classics he takes up the poetry of the Tang dynasty, the Elizabethan age of Chinese poetry, and it is a pleasure to sit in the class-room on examination day and listen to the students chanting the odes of Li Tai-po or Tu-Fu, the rhythm of which is quite equal to that of Horace or Anacreon. All the choicest works of the greatest poets of the past are thus stored up in the mind of the student at an age when it will be impossible for him to forget them.

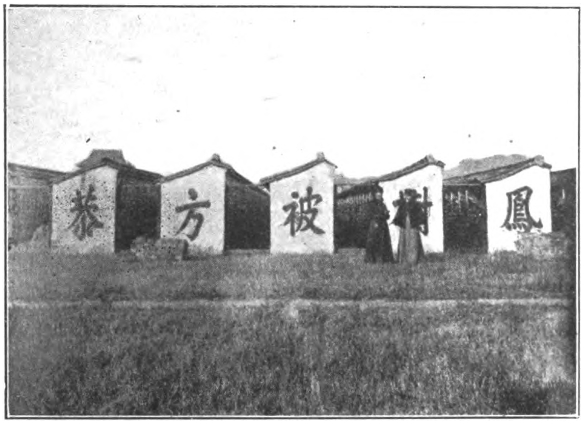
With the study of poetry he also takes up the study of belles-lettres, or *Ku-wen*, — the *wen-changs* or essays of the ancient masters of literature. This is an interminable task. It seems to be an effort on the part of scholars to embody the greatest number of references to the most interesting incidents of the past in the choicest possible language and the fewest words. And the student pores over volumes of these essays, committing them to memory, in the hope of absorbing the style of their author, or developing in himself one equally good. It is thought boiled down to its last consistency in words. Take, for instance, the following advice from the great philosopher and statesman Han Yü regarding the treatment of Buddhist priests:



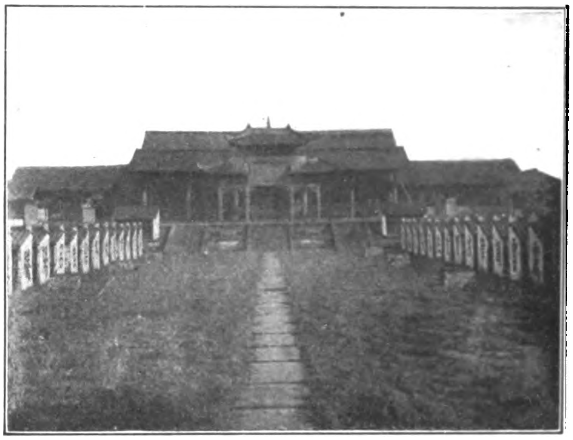
Interior of an Elementary School.



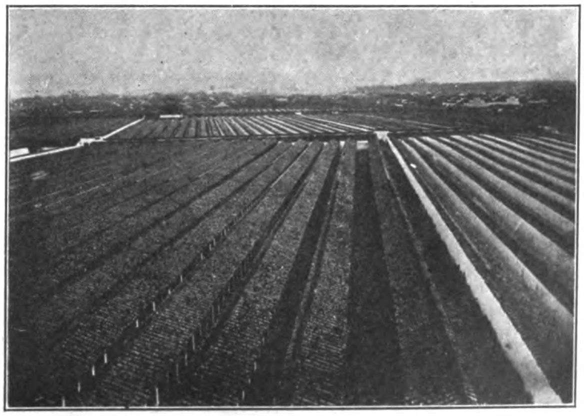
Exterior of an Elementary School.



Examination Halls, Chentu.



Examination Halls, Chentu.



General View of the Examination Halls, Nanking.

Ruined Examination Halls of the University, Peking.

The Old Education in China.

j'en ch'i jen, lu ch'i chü, huo ch'i shu, which translated literally is *man their men, house their temples, fire their books*. Let the reader try to interpret it for himself before going further. To the Chinese scholar it meant: " Make laity of their priests, make dwellings of their temples, and burn their books."

Or take the following from Giles' translation of *Strange Stories from a Chinese Studio*, Vol. I, p. xviii, and observe the references it embodies: "'Clad in wistaria, girdled with ivy,' (1) thus sang San-lu (2) in his *Dissipation of Grief* (3). Of ox-headed devils and serpent Gods (4), he of the long-nails (5) never wearied to tell. Each interprets in his own way the music of heaven (6); and whether it be discord or not, depends upon antecedent causes (7). As for me, I cannot, with my poor autumn firefly's light, match myself against the hobgoblins of the age (8). I am but the dust in the sunbeam, a fit laughing stock for devils (9). For my talents are not those of Yü Pao (10), elegant explorer of the records of the Gods; I am rather animated by the spirit of Su Tung-p'o(11), who loved to hear men speak of the supernatural." In these few lines of the introduction to his book the author has eleven references, the recognition of which is like the meeting of old friends to the Chinese scholar.

Such in brief is the course of study through which the student must pass. He is now at liberty to range throughout all literature. The history of China he must study minutely, with all the varied biographical incidents of the great men. He must study philosophy, which he will find embodied in the Encyclopedia of Philosophy (*Hsing Li Ta Chüan*), a compendium of the most brilliant sayings of the sages. But in addition to these orthodox philosophers, he has bound up in another set of books the *Twenty-four Philosophers*, who, in spite of their heterodoxy, have taken a high place among the thinkers of the past — Chuang-tze, mystic moralist, and social reformer, Yang Chu, the Epicurean, and Motze, who held that " universal mutual love," *every one loving every one else as he loves himself*, was a panacea for all earthly ills, — though even in his school life he will be compelled to take up the study of Chou, Chang, Cheng, and Chu (there being two brothers Cheng), the five great philosophers of the Sung dynasty, who made that period as brilliant for its philosophic scholarship as the Tang was for its poetry.

The student is expected to be familiar with all the scientific books, — falsely so-called, — books on the stars, on the rocks, on flowers, on animals, on the laws of nature; for be it remembered that, while the Chinese have devoted much time to the study of all these subjects, they have never organized their thought into anything like a science of astronomy, geology, botany, zoölogy, physics, or chemistry, or any other natural or applied science. Indeed, the Chinese have never originated any science, nor contributed anything to the development of science, nor studied any results of scientific thought until it was introduced from the West, so that their ideas of nature and the laws are remarkably simple and in some cases very absurd. They have what may be called a system of natural science in their *Feng-shua* (*Wind-water*) which purports to explain the influence of the occult laws of nature on human life, and which the student is expected to understand; but the final interpretation of these laws is usually left to the soothsayer.

It will be noticed from what I have given that there is nothing in the Chinese course of study in the way of mathematics or science, or indeed in any line of thought, which will tend to develop the thinking faculties, such as reason or invention, and hence these faculties have lain dormant in the Chinese mind. They have never invented anything. They have stumbled upon most of the useful, practical appliances of life, and among these upon the compass, gunpowder, and printing, and, though noted for their commercial astuteness, have lacked all power to develop them into a commercial success.

For more than a thousand years the Chinese have had two great educational institutions — the *Kuo Tze Chien*, or *College for the Sons of the Empire*, located at Peking, and the *Han Lin Yüan*, or *Forest of Pencils*, also at the capital. They are, however, without any of the characteristics of what with us go to make a college. The former is a square building, in close proximity to the Confucian Temple, surrounded by a series of low sheds which cover granite monuments or slabs on which are carved the text of the *Four Books* and *Five Classics*. There are no dormitories, no professors, and no students, except as students from the provinces come to visit the place during the great triennial examinations. The *Han Lin Yüan* was originally composed of the masters in all departments of learning—philosophy, literature, art, the drama, etc. There was connected therewith a great library, in which there was a single encyclopedia, which contained as many volumes as there are days in one hundred years. This, however, was burned by the Boxers in 1900, and the buildings and library were all destroyed, and with the development of the new education since that time, there has been no effort to restore the *Han-Lin* nor to develop the *Kuo Tze Chien*.

Civil Service Examinations. — The old examination system in China is the fruit of 4000 years. It began with Shun (2200 B.C.), who examined his officers every third year, " emphasizing the able and promoting the worthy." By the time of the Chou (1115 B.C.) the fitness of an official consisted in his ability to excel in playing a musical instrument, shooting with the bow, riding horseback, writing, and arithmetic, while at the same time he was expected to understand the rites and ceremonies of public and private life. A thousand years later Confucian morals were added. He was required to be filial and honest, and to understand civil law, military affairs, agriculture, the administration of the revenue, the geography of the empire, and the waterways. During the Tang and Sung dynasties (700–1200 A.D.) he had to be versed in poetry, literature, philosophy, and art, while, during the last seven hundred years, when selections from the best literature have been collected in an encyclopedia which contains as many volumes as there are days in a hundred years, and when one emperor (Chien Lung) has written as many separate poems as there are minutes in two weeks, one could hardly hope for success, but in a life of unremitting toil.

They have five degrees, *hsiu-ts'ai, chü-jen, chin-shih, han-lin,* and *chuang-yuan.* The examinations for the *hsiu-ts'ai* were held in the country seat, conducted by a chancellor who has supervision of an entire province. Here were gathered from one to two thousand competitors, from the boy in his teens to the old man in his dotage, from which fifty to one hundred were given the degree of " budding genius." Once in three years the successful candidates were examined in the provincial capital, when ten thousand, more or less, shut themselves up in little cells, three times, of three days each, to prepare compositions in prose or verse, and from these one in a hundred might be given the degree of *chü-jen,* or " promoted scholar." The next year he entered the examination at Peking, where three in a hundred were allowed to pass, and if he succeeded he was given the degree of *chinshih,* "ready for office." Thrice he has contested with his peers, and is now a picked man of picked men; and the three hundred who succeed in this last contest might enter the examination for the *Han-Lin,* or membership in the Imperial Academy, whence each might be sent as chancellor, poet-laureate, or imperial historian. Once in three years these *han-lins* were again examined and given the degree of *chuang-yuan,* a picked man of picked men of the fifth degree — a flower which bloomed but once in three years.

I. T. H.

See BUDDHISM AND EDUCATION; CONFUCIANISM AND EDUCATION: CHINA, EDUCATIONAL REFORM IN; TAOISM AND EDUCATION.

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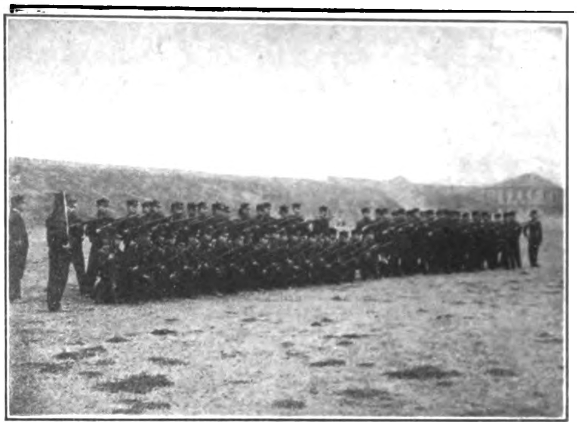
CHINA, RECENT EDUCATIONAL REFORM IN. — The changes in the Chinese educational system began, as do many great undertakings, in a simple way. To entertain the baby Emperor, Kuang Hsü, the eunuchs secured all kinds of foreign mechanical toys as playthings, in which he became greatly interested. These were supplemented in his boyhood by ingenious clocks and watches. He then obtained a telegraphic apparatus, which was adopted throughout the empire. A small railroad was built in the palace grounds, on which he had two cars and an engine. Steam launches were bought for him, which he used in the lotus lake in the palace and in the lake at Wan Shou Shan. He soon had the telephone, electric light, steam heat, the phonograph, graphophone, cinematograph, bicycle, and indeed all the useful or unique inventions of modern times, brought to him in the palace.

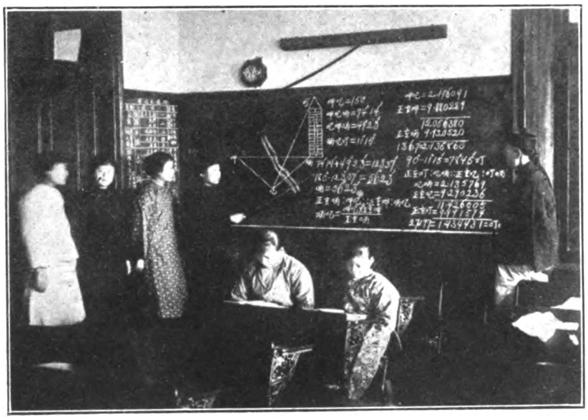
He then began the study of English, and in 1894, when a New Testament was sent to the Empress Dowager on her sixtieth birthday, he at once secured from the American Bible Society a complete Bible for himself. He studied the Gospel of Luke. This gave him a taste for foreign literature, and he sent his eunuchs to the various book depositories and bought every book that had been translated from the European languages into the Chinese. To these he gave much of his attention, and it soon became noised abroad that the Emperor was studying foreign books and was about to embrace the Christian faith. This continued from 1894 till 1898, during which time his example was followed by young scholars throughout the empire, and Chang Chih-tung wrote his epoch-making book, *China's Only Hope,* which was sent to the Emperor and led him to enter upon a universal reform, the chief feature of which was the adoption of a new educational system.

In the summer of 1898 he issued an edict to the effect that " Our scholars are now without solid and practical education; our artisans are without scientific instructors; when compared with other countries " (Germany, Russia, England, and France, who had just taken Chiaochou, Port Arthur, Wei-hai-wei, and Kuang-chou-wan) " we soon see how weak we are. Does any one think that our troops are as well drilled or as well led as those of foreign armies; or that we can successfully stand against any of them? . . . Changes must be made to accord with the necessities of the times. . . . Keeping in mind the morals of the sages and wise men, we must make them the basis on which to build newer and better structures. We must substitute modern arms and Western organization for our old régime; we must select our military officers according to Western methods of military education; we must establish elementary and high schools, colleges and universities, in accordance with those of foreign countries; we must abolish the *Wen chang* (literary essay), and obtain a knowledge of ancient and

Peking University. Football practice on the Campus.

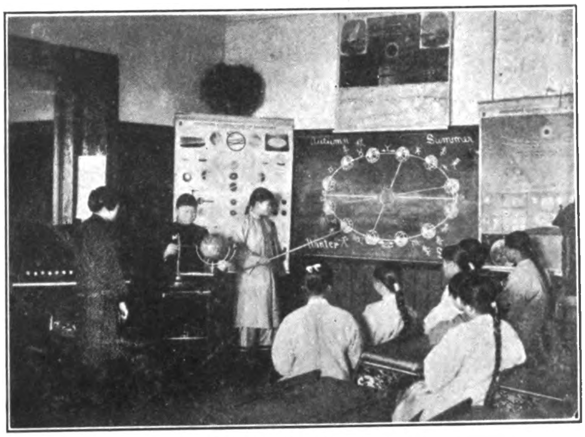


Military Cadets, Chentu, China.



A Class in Trigonometry in a Girl's School.

A Chinese Kindergarten.



"Explaining the Seasons."

Physical Culture Class in a Girl's School.

The New Education in China.

modern world history, and a right conception of the present-day state of affairs, with special reference to the governments and institutions of the countries of the five great continents; and we must understand their arts and sciences."

The effect of this edict was to cause hundreds of thousands of aspirants for office to put aside the classics, and unite in establishing reform clubs in provincial capitals, open ports, and many of the prefectural cities. Book depots were opened for the sale of the same kind of literature as that studied by the Emperor, magazines and newspapers were issued and circulated in great numbers, lectures were delivered and libraries established, and students flocked to the mission schools, ready to study anything the course contained, literary, scientific, or religious. Christians and pastors were even invited into the palace by the eunuchs to dine with and instruct them.

On June 11, 1898, the Emperor issued an edict ordering a great central university to be established at Peking, the funds for which were provided by the government, his closing words being: "We hope that all will take advantage of the opportunities for modern education thus open to them, that in time we may have many competent helpers in the great work of putting our country on a level with the strongest of the Western powers." Observe the animus of the edict, as well as that of the earlier date. It was to reconstruct the army and make China strong, enabling her to withstand the aggressions of the European powers which were at that time ready to divide her up among themselves. On the 26th of the same month he censured the princes and ministers who were lax in reporting upon the above edict, and ordered them to do so at once without further delay.

On July 10 the Emperor ordered that "schools and colleges be established in all the provincial capitals, prefectural, departmental, and district cities," and allowed the viceroys and governors but two months to "report upon the number of colleges and free schools within their provinces," saying that "all must be changed into schools for the practical teaching of Chinese literature and Western learning, and become feeders to the Peking Imperial University." He ordered further that "all memorial and other temples erected by the people, and not recorded in the list of the Board of Rites and of Sacrificial Worship, are to be turned into schools and colleges for the propagation of Western learning," a thought which was quite in harmony with that advocated by Chang Chih-tung, but not with the sentiment of the people. The funds for carrying out this work, and establishing these schools, were to be provided by the China Merchants' Steamship Company, the Telegraph Administration, and a lottery in Canton.

On Aug. 4 he ordered that numerous preparatory schools be established in Peking as feeders for the university; and on the 9th appointed Dr. W. A. P. Martin as head of the faculty, and approved the site suggested by Sun Chia-nai, the president. On the 16th he authorized the establishment of a Bureau for "translating into Chinese, Western works on science, arts, and literature and textbooks for use in the schools and colleges," and on the 19th he abolished the "Palace Examinations for *Han Lin* as useless, superficial and obsolete," thus severing the last cord that bound them to the old régime.

While the Emperor was issuing these reform edicts, the Empress Dowager was spending the hot months quietly resting at the Summer Palace at the Western Hills fifteen miles from the capital, offering neither advice, objection, nor hindrance. But when his reforms became too radical, and promised to bring about a revolution, at the earnest request of two delegations of officials and princes, she felt compelled to once more take the throne, thus placing herself in the hands of the conservative party. All his reforms except that of the Peking University, the provincial, prefectural, departmental, and district schools were countermanded, and the Boxers were allowed to test their strength with the allied Powers. After their failure, and while she was still in Hsiantu, on Aug. 29, 1901, the Empress Dowager issued an edict ordering "the abolition of essays on the Chinese Classics in examinations for literary degrees, and substituting therefor essays and articles on some phase of modern affairs, Western laws, or political economy. This same procedure is to be followed in examination of candidates for office," an edict which was quite in harmony with that sent out by the Emperor three years before.

In this same edict she said, "The old methods of gaining military degrees by trial of strength with stone weights, agility with the sword, marksmanship with the bow on foot or on horseback, are of no use to men in the army when strategy and military science are the *sine qua non* to office, and hence should be done away with forever," again voicing the sentiments of the Emperor, and indicating the root of the reform, which was the desire to make China a strong military power, able to withstand any from the West. Sept. 12, 1901, she issued another edict commanding "all colleges in the Empire to be turned into schools of Western learning; each provincial capital to have a university like that in Peking, whilst all the schools in the prefectures and districts are to be schools or colleges of the second or third class." On Sept. 17 she ordered "the viceroys and governors of other provinces to follow the example of Liu Kun-yi of Liangkiang, Chang Chih-tung of HuKuang, and Kuei Chun (Manchu) of Szechuan, in sending young men of scholastic promise abroad to study any branch of Western science or art best suited to their tastes, that in time they may return to China and place the fruits of their knowledge at the service of the Empire." What now was the result?

The Imperial College in Shansi was opened with 300 students, all of whom had the Chinese degree of B.A. It had a Chinese and a Foreign department, and after the students had completed the first they were allowed to pass on to the second, which had six foreign professors who held diplomas from Western colleges or universities, and a staff of six translators of university textbooks into Chinese, superintended by a foreigner. In 1901–1902, ten provinces opened colleges for which they raised more than $400,000. At the request of Governor Yuan Shih-kai of Shantung, Dr. W. M. Hayes resigned the presidency of the Presbyterian college at Teng-chou-fu, and accepted the presidency of the new government college at the provincial capital. He drew up a working plan of grammar and high schools for the province, which were to be feeders for the provincial college. This was approved by the Governor, embodied in a memorial to the throne, copies of which the Empress Dowager sent to the governors and viceroys of all the provinces, declaring it to be a law, and ordering " the viceroys, governors, and literary chancellors to see that it was obeyed." Dr. Hayes and Yuan Shih-Kai soon split upon a regulation which the Governor thought it best to introduce, viz. " that the Chinese professors shall, on the first and fifteenth of each month, conduct their classes in reverential sacrifice to the Most Holy Teacher Confucius, and to all the former worthies and scholars of the provinces." Dr. Hayes and his Christian teachers withdrew, but it was not long until those who professed Christianity were excused from this rite, while the Christian physicians who taught in the Peking University were allowed to dispense with the queue and wear foreign clothes as being more convenient and sanitary.

When Governor Yuan was made viceroy of Chihli, he requested Dr. C. D. Tenny to draw up and put into operation a similar schedule for the metropolitan province. This was done on a very much enlarged scale, as was also the case in many of the other provinces, and at present (1909) " the Chihli province alone has nine thousand schools all of which are aiming at Western education, while in the Empire as a whole there are not less than thirty to forty thousand schools, colleges, and universities, representing some of the educational changes that have taken place in China during the past eight years."

The New Education among Women. — As a result of a conversation with certain foreign ladies, the Empress Dowager issued an edict approving of the education of women. Two of the sisters of Prince Su, one of them the wife of a Mongol Prince, Ka-la-chin, at once set about opening schools for girls, one of them in Peking, and the other in a Mongol village some two hundred miles from the capital. Prince Su opened in his own palace a school for his daughters, his daughters-in-law, his deceased brother's children, and his concubines, in which they studied Japanese, arithmetic, drawing, embroidery, music, and calisthenics, while they drilled to the music of an American organ. In all these schools both Japanese and Chinese teachers were employed, and during the first year after the edict appeared there were not less than eight large select schools for girls opened in Peking, with innumerable private schools like that of Prince Su, while similar select and private schools were opened in all parts of the empire. A lady in Hangchou undertook to open such a school, and appealed to the officials and people for funds for its support. These were readily subscribed the first year, but the second year her appeal met with a less favorable response, and she cut a great gash in her arm and sat in the temple court at the fairs to arouse public sympathy. Failing to secure sufficient funds in this way, she wrote to the officials, saying that " When these letters reach you I will be a corpse, as I propose to take my own life in order to arouse public sentiment to the importance of the education of girls." This she did, and memorial services were held, and subscriptions taken for her school all over the empire.

In all these schools — for boys as well as girls — the primers and readers which have been substituted for those of the old régime are prepared in a style similar to our own. Characters most easily recognized are used in the first lessons, simple sentences are constructed which will be easily understood by the child, and each lesson is illustrated by an appropriate woodcut, while the old method of committing to memory is relegated to the educational museum of the past.

The following are some of the questions given at the triennial examinations of 1901–1902 in 6 of the provinces: —

1. " As Chinese and Western laws differ, and Western people will not submit to Chinese punishments, what ought to be done that China, like other nations, may be mistress in her own country? "
2. " What are the Western sources of economic prosperity, and, as China is now so poor, what should she do? "
3. " According to international law, has any one a right to interfere with the internal affairs of any foreign country? "
4. " State the advantages of constructing railways in Shantung."
5. " Of what important advantage is the study of chemistry to the agriculturist? "

I. T. H.

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See references to previous article.

CHIVALRIC EDUCATION. — The form of education open to the upper or noble classes in the Middle Ages is (despite some modern literature on the subject) still far from clear. The manuscript authorities are still more or less closed, and some modern notions (such for instance as the theory that the post-Reformation system of secondary schools owes much to chivalric education) are open to great doubt. The present discussion is based on the propositions that feudal lords adopted with various modifications the educational ideas that were elaborated in the Palace Schools of Charlemagne (*q.v.*) and (perhaps) Alfred (*q.v.*) and applied them to the condition of things that sprang from the feudal fee and feudal rights of wardships and marriage. It is necessary to remember that the feudal lords who were in the long chain of feudal service that began with the king and passed down to the smallest knight's fee or tenement, in reality formed, so to speak, a class or caste that had educationally little in common with the dependent free and unfree classes that rendered services to the lord of the fee and of the manor. It is of course true that the Hall and the Demesne lands of the manor were the rallying center of an entire community, a center that had very largely absorbed the ancient township, though it had not brought within manorial control the parish priest, who with his township or parochial school represented the culture of the people as opposed to the chivalric education of the Hall. But educationally the noble had little in common with the serf, and that these two aspects of education clashed is known from the manorial regulations limiting the educational facilities of the serf population, regulations which were swept away by the Statute of 1406 that threw open the parochial schools to all boys and girls, whether free or unfree.

Chivalric education was largely based on the necessities of the old law of wardship and marriage, and it is therefore necessary to state, as succinctly as may be, that law. If a man held a tenement by knight's service or military sergeanty of a mesne lord, and died leaving a son under age as heir, the lord had the wardship of the land until the heir attained 21 years or died under that age. The lord had the right to the rents and profits of the tenement for his own use, but had to provide for the youth's maintenance and pay the dead man's debts. The lord was also entitled to the custody of the body of the heir, and was entitled to the boy's "marriage"; that is to say, he could sell him in marriage provided that the marriage was not a disparaging one. In the case of a female heir the lord's rights were much the same. Complicated questions might arise if the tenant held in respect of several tenements of various lords, since of course only one lord could have the custody of the heir. As a rule that lord was preferred "from whom, or from whose ancestors, the most ancient of those titles was derived. . . . If the dead man held in chief of the Crown by knight's service or by grand sergeanty, the king was entitled to the wardship of the heir's body and to his marriage, no matter how many other lords there might be, and no regard being had to the relative antiquity of the various titles by which the tenements were held; no one can compete with the king. But further, the king was entitled to the wardship of all the lands which this dead man held, no matter of whom he held them. Such was the right of 'prerogative wardship,' and a section in the Great Charter had been necessary to keep it within these spacious bounds." (Pollock and Maitland, *History of English Law, before the time of Edward I.* Vol. I, pp. 301–302.)

In addition to this it must be remembered that the right of wardship and marriage was saleable, and was in fact frequently sold. Bearing this in mind, what may be called the bare machinery of chivalric education becomes fairly clear. The fact that a lord had the custody of his ward rendered some educational provision necessary. The fact that he had the right of marrying his ward to some other young person of adequate birth and fortune rendered the advantageous association of suitable young people of both sexes also desirable, if not necessary. If a lord was not in a position to give the necessary education and association, it was clearly to his advantage to sell his right of wardship and marriage to some other lord who could provide both education and opportunities of suitable marriage. Thus by a species of economic law there was a natural drift of marriageable wards into the larger Halls and households. The king, with his right of prerogative wardship, undoubtedly provided the best school of chivalry, but it may be doubted if the king habitually or indeed often purchased wardships, and thus other great households competed with the Court as a place of training for the gilded youth of the thirteenth and fourteenth centuries. Girls were, in their earlier years at any rate, not educated in the household. The convent schools received them, and taught them admirably the arts of sewing, weaving, music and song, elements of medicine and first aid, and Latin. There were certain well-known nunnery schools for girls of the highest class. The Dartford nunnery in Kent received girls of royal rank. Carow nunnery, near Norwich, was a famous school for girls of high birth, and the same may be said of St. Mary's nunnery school at Winchester. From these schools the girls passed into the "Bower" of the Household, there to receive the final touches of chivalric culture and there to meet the noble youths whom they were destined to marry. The fact that there were in these households marriageable heirs and heiresses drew to the households noble youths and maidens, who, though not in wardship, were sent thither by parents who understood the ways of a world that differed only in form from the world as it is lived to-day. To marry and to be given in marriage in the most suitable fashion was one object, if not the supreme object, of chivalric education. But this is not a cynical criticism of chivalric education, for the words "suitable fashion" imply many things. A high and noble standard of life was set before the young people, and one may doubt if that age or any age could have set to work with nobler ideals to form men and women fit to carry on a particular conception of civilization. The long and determined resistance of chivalry and of the feudal system to the inroads of a commercial generation from the late fourteenth century onwards is one of the significant facts of English history. The fact, indeed, of *noblesse oblige*, which may be said to have been the normal basis of chivalric education, long survived both chivalry and feudalism, and is not dead to-day. It is therefore desirable to consider in some detail the machinery, so to speak, of chivalric education, since it undoubtedly gave to national education in the largest sense a moral undernote that has survived the changes and chances of time. The fact that the universities, after the Reformation and the final disappearance of formal chivalric education, made special provision for and offered special privileges to members of the nobility was not a policy *sine nobilitate*, but a deliberate and not unsuccessful attempt to graft into the highest stage of national education the culture and the *morale* that had been begotten by, and had happily survived, feudalism.

The children of both sexes were brought up with the women of the household until the age of 7 years, but before this age the boys were taught to ride. The children were taught to write quite early, and used wax tablets with a *stylus* to prevent waste of parchment. Apart from the regular intellectual education, the boys from the ages of 7 to 15 years were taught to fence and hunt. Fencing included sword and lance practice and the use of the singlestick. Hunting in the thirteenth century was a regular science of the most complicated kind, involving a knowledge of the forest laws, and was divided into two branches, each of which had to be known in detail, namely (1) venery, the art of hunting the deer and so forth, and (2) falconry, a most difficult and involved business, comprising the knowledge how to fly, feed, call, and hold the various classes of birds such as the Gerfalcon, the Sacre, the Pélerin, the Gentil, and the Lavier. When it is realized how much the children had to learn before the age of 15 in the way of arms and sports (such as wrestling, boxing, running, riding, tilting at the ring, quintain, bull and bear baiting) it is not at all surprising that in a considerable percentage of cases even the arts of reading and writing were forgotten in later years. These arts in the case of many children did not compete in interest with the arts of controlling a horse, a gerfalcon, a lance, a sword. The same may be said of music. There were opportunities to learn the use of instruments and to train the voice, and no doubt those boys or young men who had a taste for music took advantage of the opportunities, especially as the gift for minstrelsy was greatly appreciated in the age that was largely dependent on the efforts of the amateur for amusement. The houses where training could be secured were not limited to the halls and castles of the nobility. Some of the great religious houses also maintained schools of chivalry (in virtue of the fact that they were often lords of manors and had rights of wardship), and no doubt in such schools the teaching of "song" received very special attention.

But the life of the varlets or *damoiseaux* (as the young pages were called; the girls of the household were of course the *damoiselles*) was in many ways a hard one as they grew older and more capable of doing the work of the grade above them, that of the squire. We have seen something of their outdoor training, but the indoor life was even busier. There were the school lessons of which something will be written directly, but assuming (and the assumption is a considerable one) that the arts of reading and writing had been acquired, it is clear that the poor little *damoiseau* had before him what must have been a dreary vista to many minds. It was essential that the boy should become expert at heraldry, a most involved and complicated art, that he should become a competent carver of meat, another almost forgotten art, that he should acquire all the arts of the valet, the groom, the armorer. Thus at table the squire carved and then handed the wines and dishes and was followed along the table by the pages or varlets carrying the dishes that he is to hand. Then again it was the business of the squires and pages to make the beds, to help the Lord to dress, to groom the horses, scour the armor. Moreover, the squire slept in his lord's room or at the door for the purpose of giving him protection at night. The squire, indeed, was busy, for the training of the pages was his duty. He had to teach the *damoiseau* to ride as a squire should ride, to speak tongues (English and German; *damoiseaux* as well as *damoiselles* all learned to speak French), to harp and pipe, to sing and dance, and these things (and other forms of culture and *courtoisie*, such as chess, and the rules of good manners and gallantry) were impressed on the varlet's mind "with corrections in their chambers." One of the chief manuals of manners was Bishop Grosseteste's *Stans puer ad mensam*. It was a hard and busy life, and its softer side was (to a boy) arduous enough: the boys and squires had to wait on the ladies of the Bower, to play chess with them, walk with them, dance with them, harp and sing to them. The freedom allowed between the two sexes appears to have been great, and deliberately great as part of the education in chivalry. Scandals no doubt occurred on occasions, but such things were rare, and on the whole the freedom justified itself. It must be remembered that marriage was always one end aimed at by the system, and certainly in a hard age that recked little of bloodshed, of pain and suffering, this chivalrous intermingling of the two sexes did much to add a tenderness, a sense of honor, an atmosphere of compassion and religion to the round of daily life. The part played by religion is very important. All through the educational period the boy (first as varlet or page or *damoiseau,* then as squire and at last — at 21 — as knight) has lying before him the impressive religious ceremony of his investiture as knight, his robing with a white tunic for purity, with the red robe to show that he has blood to shed for the faith, the Black Doublet to keep death before his mind, and then the night of watching in the Church, the confession, the Holy Communion, the ritual of the *Missa de sancto spiritu,* the sermon on the Knightly Life. Betwixt the young boy first learning the art of knightly life and the moment when the armor is put on lay some ten years of continuous training with a definite religious and moral purpose in view. This clearly appears in the Ms. evidence on the subject. The following account is taken from a late fifteenth-century Ms. of a thirteenth-century treatise on the subject of this training in the British Museum. The work in question was very popular and its use long outlived the formal schools of chivalry. The Ms. is a translation of *De Regimine Principum,* written for King Philippe le Bel of France, before his accession in 1285, by his tutor Egidio Colonna, who is known to students of this work as Giles de Romme. This translation into French was executed at the request of Philippe by Henry de Gaud, or Henry de Gauchy, or possibly by Gyles de Campus (Deschampes). This *Tracte de Gouvernement des Princes* asks early in Part I what is the "soverain bien de ceste mortele vye"? The answer comes that it is not "delit du corps" nor riches nor "honneur mondaine," nor glory and renown nor force of courage; nor does it lie in "force santé et beauté de corps," but in (cap. 11) "euvres de largesse" and in governing according to law and reason. The second part goes on to discuss "La vertue de sagesse," and declares that "les rois et princes doivent estre sages," that "sans justice et sans droiture les Roiaulmes ne peuvent durer," lays stress on the importance of force and courage, and on the virtues of temperance and largesse. The second part of the second book directs the teacher (cap. 5) to instruct children "en la foy catholique de sancte eglise," (6) "instruire en jeunesse a bonnes meurs et bonnes manères avoir," (7) "aprendre en jeunesse les sciences de lettre et de clergie." The crown of all is *Courtoisie,* coupled with good laws for the people. Something more must be said about the seventh chapter, as it deals with the question that has up till now been left undiscussed in this article, the intellectual training of the pages, or damoiseaux. The chapter covers ten pages (folios 198*a*–208*b*). It is entitled "les enfans des gentilz homes et des rois et princes doivent aprendre en jeunesse les sciences de lettre et de clergie." Not only must Latin, but all other things that are to be well learned be learned in youth. We get on this point the striking phrase, "aussi pour ce que les sciences sont longues et la vye de l'Homme est brief, ne il convient commence de aprenre ene jeunesse." We are very sharply made to see that the intellectual training of the court school was certainly not behind that of the grammar school. "Les philosophes dirent que ils font sept sciences frances et liberaulz a scavoir: — Gramaire, logicque, Rethoricque, musicque, arithmeticque, geometrie et astronomie, les quelles sciences les philosophes apelent liberaulz pour ce que les enfans des princes les souloient aprendre. Et aprendoient premièrement gramaire. . . ." We are told that rhetoric is necessary for the children of princes, that arithmetic, the science of numbers, is learned by the children of the gentry, for without arithmetic they cannot know music perfectly, that geometry teaches "les mesures et les quantités" of things, and is necessary to astronomy, which teaches the quality, distance, and number of the stars. But Giles de Romme, court teacher in the late thirteenth century, does not limit the range of study to the Trivium and Quadrivium (*q.v.*). There are other sciences of peculiar value to the kingly, that are more noble than the seven liberal arts. There are (1) natural science, which deals with the nature of things; (2) *la science metaphysicque,* which gives knowledge of God and of his angels; (3) Theology; (4) Ethics — the science of governing yourself; (5) *Yconomicque* — the science of governing your house; (6) *Polliticque* — the science of governing cities and kingdoms. Truly the curriculum in the school for princes was advanced enough in the thirteenth century, and it must be remembered that the lesser courts of Prince and Duke and Earl and Baron and wealthy Knight were modeled on the Court of Philippe or of Edward III. No doubt the teachers varied in quality and the standard varied from Hall to Hall, and a good deal depended on the warlike activity of the time and the opportunities for sport, for the use of the bow and the gerfalcon, but the fact remained that these boys had as an ultimate ideal the above curriculum, and also had to learn French (out of books such as that written by Walter de Bibelsworth (*q.v.*) for the House of Lady Dionysia de Monchensy of Swanscombe in Kent toward the end of the thirteenth century), heraldry, and all the other arts and graces of which mention has been made. It was certainly a very complete education; not less complete in its way than that given by the grammar school and the university combined.

One word in conclusion must be said as to the decay of chivalric education. When we enter the fifteenth century its days of glory are over, though the greater schools lasted on. But the century itself did much to complete that rout of feudalism which commerce had already begun. In the *Gloucester Grammar School Case* of 1410 it is spoken of as a common thing for a man to "retain a master in his house to teach his children." The private teacher, who for the four succeeding centuries was to play so large a part in the education of the nobility, had begun to take the place of teachers like Alcuin, who taught (of course in one sense in a private house) the children of various families, a common and high standard for the nobility being the end aimed at. After the Renaissance books poured forth dealing with the education of the sons of the nobility and gentry, but it is doubtful if any of them were better or even as good as the *De Regimine Principum* of Egidio Colonna, on which indeed many of them were based. Colonna's book was world-famous. The Ms. catalogue of the library of the parson of King's Swinford in 1432 (Rolls, *Early Chancery Proceedings*, Bundle 12, 250) contains a work called *De Regimine parvulorum nobilium*, which is possibly Egidio Colonna's book, but the fact that a book of this name was in use in 1432 shows that at that date the special education of the nobility still continued. An excellent collection of works on the subject of courtly training from the fifteenth and sixteenth centuries is to be found in the *Babees Book* edited by the late Dr. F. J. Furnivall. In the sixteenth century there appears a series of books dealing with the education of the children of the nobility, works such as Castiglione's (*q.v.*) *Cortegiano*, Elyot's (*q.v.*) *Gouvernour* (1531), the *Institution of a Gentleman* (1555), Humphrey's *Optimates*. But by this date, except perhaps to some extent in Italy, the medieval system of chivalric education had gone, and private tutors superintended the education of single pupils. The course of education was largely guided by books of the type named. In England the practice had arisen in the fifteenth century for young men of noble birth to join one of the Inns of Court, and these Inns in some fashion become a university or *Studium Generale* for noble youths (see Fortescue's *de Laudibus Legum Angliae*). At the same time or a little later the same class began to attend Oxford and Cambridge with special privileges, and a gradual assimilation of the type of education given to the noble and to other scholars took place. Professor Watson finds in the sixteenth and seventeenth century curriculs usual in the case of the children of the nobility one of the sources that enlarged the curricula of ordinary schools. Mulcaster in the late sixteenth century advocated a special training for princes. They need *Courtoisie* more than do ordinary men, and the knowledge of tongues, of theology, political science, and religion. Thus the ideals of the old chivalric education still swayed the minds of teachers in days when the old education itself was passing away. The same ideals prompted the advocacy and establishment of academies in the seventeenth century. If the educational forces that were at work translating the medieval into the modern world are to be understood, the history of chivalric education cannot be neglected. J. E. G. DE M.

See ACADEMIES; GENTLEMEN, EDUCATION OF; MIDDLE AGES, EDUCATION IN; RENAISSANCE, EDUCATION IN THE; SOCIAL REALISM.

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CHOICE. — When volition takes place under conditions such that the reactor is conscious that he might have followed either one of two or more courses, the process is called a choice.

See VOLITION; WILL.

CHOICE REACTIONS. — See REACTION EXPERIMENTS.

CHORD. — A combination of more or less simple musical tones, usually such as produce harmony, *e.g.* the major chord, the minor chord, the dominant seventh, the diminished seventh, etc. In scientific works it is often used broadly to include any combination of tones, whether consonant or dissonant. The former are called concords or harmony, the latter discord. C. S.

CHOREA. — This name is given to a symptom, and at the same time to certain definite diseases of the nervous system in which the symptom is prominent. The choreic symptom is a rapid, uncontrollable twitching of a muscle or group of muscles, which may be slight or severe, and momentary or continued. The symptom is found in hysteria (*q.v.*), in the so-called choreas of Friedreich, of Morvan, of Bergeron, and of Dubini, in Huntington's chorea, and in Sydenham's chorea. The choreas of Friedreich, of Morvan, of Bergeron, and of Dubini are more properly called myoclonias, and need not be discussed here. Huntington's chorea is an incurable nervous disease occurring in adults, but is so rare as to warrant description only in textbooks of nervous diseases.

The *chorea of Sydenham,* or *chorea minor,* is the most common and the most important of these diseases, and is almost exclusively found in children. From an examination of the histories of over two thousand such patients treated in his clinic Starr shows that only one third of the cases are boys and young men, and that the disease occurs most frequently between the ages of 6 and 15. Only 5 per cent of his cases began before the age of 6, 45 per cent began between the ages of 6 and 10, 38 per cent between 11 and 15, 10 per cent between 16 and 20, and only 2 per cent began after the age of 20. It will be noticed that this is a disease coincident in time with school life. A seasonal variation has been noted by some observers, the greatest number of cases beginning in the spring months, from March to July. In most of the cases the twitchings are bilateral, but about one third of the total show only unilateral disturbance.

The disease is chiefly found among excitable and nervous children, usually of neurotic parents, and especially among those who are abnormally bright and precocious. It is said to be brought on by emotional shocks, such as those of fright or of grief, and by mental strain. The emotional shock may precede by only a few hours or by as long a period as several weeks the beginning of the motor disturbances. Lack of exercise, improper food, and bad air help to undermine the system and predispose to an attack. The latter conditions, associated with mental strain from the continued work of the school year is taken to explain the increased morbidity during the spring and early summer months.

The average duration of the disease is about three months. During the first month the symptoms usually increase in severity, and then gradually diminish. There is a tendency to the recurrence of the attacks at the same season each year, and this may also be accounted for on the ground of bad hygienic conditions during the winter months and the strain of continued school work. Starr states that chorea is not a direct sequela of the acute infectious diseases which children have, and that heredity plays only a small part.

The choreic movements are irregular twitchings of certain muscles, usually those of the face and of the arms and legs, although in severe cases the muscles of the neck and of the trunk may be involved. In the face region the lips, nose, tongue, and jaws are most often affected, and protrusions of the tongue, snapping or biting movements of the jaws, and grimaces are common. If these movements cannot be controlled, the speech becomes explosive in character and there is at times a decided hesitancy. In many cases one of the earliest signs is an inaccuracy in the movement of the hands and arms, evidenced by an inability to properly perform acts that are even habitual. Liquids carried to the mouth may be spilled, the clothes and the shoes may be buttoned or laced inaccurately and only with great difficulty. In the involvement of the legs the gait is unsteady and there is a staggering due to the irregularity in force with which the feet are propelled and placed upon the floor. Muscular weakness and irregularity in the force of movements accompany the involuntary motor disturbances. When the child is told to grasp your hand firmly and steadily, inequalities in the grip will be noticed, and similar changes in the strength of other muscle groups can be determined by suitable tests.

The differences in the occurrence of the convulsive movements are marked, and this has been taken as a basis of classification. It is sufficient, however, to know that most cases show an absence of choreic movements during rest and sleep, that in some there is an increase in the movements if they are attended to and if motor tasks are to be performed, but that in some patients the involuntary movements cease upon the beginning of voluntary movement.

Chorea is to be differentiated from convulsion (*q.v.*), from the various kinds of tic (*q.v.*), and from the false chorea which is found in hysterical people. (See HYSTERIA.) In the latter case the motor phenomena are not accompanied by weakness and by the mental changes, and the movements can readily be stopped for a time by suggestion or by forcible command. The term *St. Vitus's Dance* has been used to include all forms of chorea, but this wide use is now limited to the laity, and restricted in a medical way to the chorea associated with and caused by hysteria.

In true chorea there are mental changes coincident with the motor disturbance. Irritability, forgetfulness, at times a moral obliquity, disturbances in sleep, and occasionally visual hallucinations have been noted. If the eye muscles become involved, diplopia, with its mental effect, may be present.

From the educational standpoint all children with chorea of whatever form should be treated alike. They should be removed from school and placed under proper medical care and treatment, both for their own benefit and for the sake of the other children in the class and in the school. If suffering from Sydenham's chorea, the child is unable to properly perform his school work, and it is harmful to him to permit him to continue. Rest, proper food, good air, and suitable exercises are advisable, but often a simple change in environment will cause the symptoms to subside. On the other hand, on account of the marked suggestibility of many children, it is essential that the choreic child be removed, else his movements may be taken as an example and copied. In this way many cases of hysterical chorea, or St. Vitus's dance, may be produced, and there may result a real epidemic similar to the dancing manias of the Middle Ages. S. I. F.

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CHORISTERS' SCHOOLS. — The origin of our modern schools has often been attributed to choir or choristers' schools, but without any reason. It is doubtful whether there were, and almost certain that there were not, any choristers before the middle of the eleventh century, if then. There is, for instance, no trace of choristers in the Institution of St. Osmund of Salisbury in 1091. Their number in medieval churches was so small, the highest being 12, that a school for them was not needed. When, in the thirteenth century they first appear in documents, we find only 8 at St. Paul's, 7 at York and Beverley, 12 at Lincoln, and so on, though the number of canons was then 30 at York, 50 at St. Paul's, and 60 at Lincoln. They were at first merely regarded as charity boys, and looked for their food to the broken meats of the residentiary canons, and did errands in the choir. At St. Paul's an Almonry was first established about 1180, and in it the boys, afterwards called quiresters or choristers (*choristae*) who had previously lived where they could, were housed together. (See ALMONRY SCHOOLS.) These boys stood in pairs at each corner of the choir, and it would appear that their main duty was not that of singing, but of carrying candles and incense-burners. They are not called choristers till the fourteenth century, when they were increased to 10.

At Lincoln the first mention of choristers is in 1254, when the monastery of Caldwell granted two marks a year rent charge to the Precentor of Lincoln for the 12 boys ministering in Lincoln church, viz., the candle bearers and incense bearers (*ciroferariis et turribulariis*) elected if fit in the office of singing and serving. The Choristers' Register begins: " For perpetual remembrance of the matter be it known that the boys of the choir of Lincoln used to live on the alms of the canons. But Bishop Richard of Gravesend," who came from London and introduced the St. Paul's arrangement, "ordained that they should be twelve in number, of whom two should be incense-bearers and five together in common in one house under a master." He bestowed upon them separate endowments, relieving the precentor of the responsibility for their admission and discipline, and gave it to the dean and chapter, one of whom was appointed supervisor or *custos* of their house. The *New Register* of Dean Lexington (1263–1272) under the duties of the precentor mentions that of presenting to the dean and chapter a master to teach the choristers song and grammar, and if he cannot find one able to do both, separate masters for each. This master is shown by the chapter records to be distinct from either the general grammar schoolmaster appointed by the chancellor or the general song schoolmaster appointed by the precentor. It is probable that at first he was merely a private tutor, or housemaster to teach and look after the boys in their house, and that they still attended the general grammar school and song school.

From 1477 the choristers learned singing and music from a special master, who was also the organist. In Edward VI's reign, the old school of the city was made a Free School, the Chapter being made to pay a salary of £20 to the master, whereas formerly he had lived on tuition fees. During the reign of Queen Mary, the Bishop of Lincoln, White, who had been Headmaster of Winchester College, erected this choristers' school into a New College of 30 poor clerks who were, like those of Winchester and Eton, from all over the country. There had long been a body of 12 poor clerks attached to the cathedral, who looked after its various altars, and were frequently warned to attend the Grammar School. This New College represented an attempt to make them a regular Public School. It was suppressed again with the altars in Elizabeth's reign. In 1570 the old Grey Friars' church was given for a schoolhouse to the city grammar school. The competition of this school proved too much for the Choristers' Grammar School, and in 1583 the two were reunited, the city paying the master, and the Chapter the usher, and so remained till 1850.

At York the choristers were first brought under one roof when, on May 6, 1307, the Chapter contracted with one Richard of Craven to maintain the 7 choristers in table and learning for 4*s*. 8*d*. a week, or 8*d*. a week each; centuries after the School of York made its appearance. On Aug. 23, 1346, the chaplain of one of the canons was appointed to look after them and live with them. No choristers' school as a separate institution seems to have been developed at York. The Hospital of St. Leonard at York had, at the Dissolution, an independent choristers' school for its 12 choristers, who were taught grammar as well as singing, and its right to this school had been asserted by a royal writ in 1340, because, being a royal foundation, it was exempt from the Chapter's jurisdiction. At Beverley Minster, in 1312, a dispute was settled by the Chapter between the grammar schoolmaster and the succentor, a vicar choral, who looked after the choristers, the latter claiming that they ought to be admitted to the grammar school free, while the former claimed that only 7, the ancient number, should be admitted free, and the rest should pay fees. The Chapter found that all choristers ought to be free, but the succentor was not to admit choristers nominally to the choir merely to get free admission to this school. This sufficiently shows that the school was not by foundation a choristers' school. At Salisbury in the fourteenth century, *c.* 1314, the choristers' grammar school was endowed and developed into a rival of the old Glomery or Grammar School, and both these schools were still going on during the Commonwealth. But the grammar school died out in the nineteenth century before the competition of its better endowed rival, which, however, is now a mere choristers' school, not a grammar school. The choristers at Winchester College, founded in 1382, were more numerous than in any cathedral, being 16 in number, and the same at Eton. In both colleges they attended the grammar school equally with the scholars, and at Eton were given a preference to election for scholarships. This seems to have been the case at other collegiate and chantry schools, which embraced a grammar as well as a song school. For the scholars attended both, a famous sixteenth-century headmaster, first of Eton, then of Winchester, William Horman (*q.v.*), laying down probably from Quintilian (*q.v.*) that without music grammar cannot be perfect. Since the end of the seventeenth century the choristers' schools at Winchester and Eton, as at most of the cathedrals, have been entirely separate. The choristers were regarded as of a lower class and the grammar school education as unsuitable for them; the difficulty of making their hours suit ordinary school hours being even greater now than in the Middle Ages.

A. F. L.

See Almonry Schools: Bishops' Schools; Church Schools; Reformation, Education in.

CHRISTIAN BROTHERS, or THE BROTHERS OF THE CHRISTIAN SCHOOLS. — The Institute of the Brothers of the Christian Schools is a society composed of religious teachers, founded at Rheims, France, June 24, 1682, by St. John Baptist de la Salle (*q.v.*). The members of this Institute are not priests and may not aspire to the priesthood. By the Bull of Approbation, granted by Pope Benedict XIII, Mar. 26, 1725, the Institute was raised to the dignity of a religious congregation and an authoritative teaching body. Its founder was canonized by Pope Leo XIII, May 24, 1900, and proclaimed as the Patron of Youth.

The object of the Institute is the Christian education of youth, the cultivation of letters, the diffusion of knowledge. This is indicated in the preamble of the Bull of Approbation, *In apostolicae dignitatis solio*, as follows: "We, to fulfill the duty imposed upon us, cheerfully devote ourselves to the furtherance of institutions whose object is the cultivation of letters, and the diffusion of knowledge."

The scope of the educational system in use in the Institute includes colleges, technical and industrial schools, academies and high schools, elementary and grammar schools, commercial colleges, asylums, and protectorates. It is evident that De la Salle planned his work upon a broad scale and adapted his methods to the varied conditions of time and place. Thus he devised a system complete in all its details from the elementary grades to the collegiate curriculum.

The government of the Institute is administered by a Superior General and twelve Assistants. The former is elected for life, while the latter are also elected, and hold office for a period of ten years. For administrative purposes the several communities in the different countries are grouped into districts or provinces under the supervision of Brothers Visitors, who are appointed to office by the General for a term of three years. The individual communities are also governed by the appointees of the General, and are called Brothers Directors. The center of administration is at Lembecq-lez-Hal, Belgium. Brother Barthélemy was the first Superior General, and was elected in 1717. The present incumbent is Brother Gabriel Marie, elected in 1897.

The growth of the Institute from its origin is evidenced by the following statistical table:—

Year	Houses	Brothers	Pupils
1682	6	30	1,100
1700	18	165	5,000
1750	95	662	24,000
1790	125	920	36,000
1800	3	20	500
1825	210	950	60,000
1860	986	8,385	335,000
1880	1309	12,000	380,000
1903	1569	15,457	340,000

Educational Reforms. — De la Salle originated, perfected, and applied several educational reforms which have wrongly been attributed to, or claimed by, later pedagogical reformers, viz.:—

(1) The organization and management of the elementary school, 1684–1688. (2) The perfecting and application of the simultaneous method of teaching. This method, in opposition to the traditional method, gave prominence to the vernacular as the basis of instruction, and grouped the pupils of each class according to their mental capacity, 1688. All the pupils of the same grade receive the same lesson at one and the same time from the same teacher. In his *Conduct of Schools* (1721), De la Salle gives explicit directions regarding this method of teaching. Lancaster admits "that he was astonished that the French preferred his method to that of the Brothers of the Christian Schools." (3) The grade school, 1688. (4) The Normal College for secular teachers, 1684. (5) The Christian Academy or Sunday school, where drawing, geometry, and architecture were

taught, Paris, 1698. (6) Schools for technical instruction in drawing, architecture, navigation, practical geometry, hydrography, botany, and manual training, Sain-Yon (Rouen), 1705. (7) The Reform School, Saint-Yon, 1706. (8) Boarding colleges, having for object the higher secondary courses, Paris, 1698, and Rouen, 1705. (9) The modern popular system of education, which he inaugurated, Paris, 1698, and then perfected and systematized, 1717.

Institutions of these various types are conducted by the Christian Brothers in France, Belgium, Austria, Germany, Spain, Holland, Italy, England, Ireland, and in the French and English colonies, in Algeria, Tunis, Isle of Malta, Canary Islands, and Congo (Africa). There are under the direction of the Institute 18 houses in the District of Alexandria, 22 in the District of Constantinople, 10 in the District of Jerusalem, 11 in the District of Madagascar, Isle of Reunion and Maurice, 12 in the District of India, 8 in the District of Indo-China, 4 in the District of Brazil, 9 in the District of Argentine, 12 in the District of Chile, 7 in the District of Ecuador, 19 in the District of Colombia, 15 in the District of Panama, and 7 in the District of the Antilles. It is obvious that De la Salle embraced in his program the whole scope of secondary education.

The founder clearly distinguished between pedagogy as a science and pedagogy as an art. The uniting of instruction with Christian education appeared so important to De la Salle that he constituted it the second object of the Institute, and an essential characteristic of the spirit that should animate its members.

Basic Principles. — The following are the general basic principles of his system of education: —

(1) Man is a rational being, composed of body and soul. (2) Children are as weak from the viewpoint of intellection and volition as they are in their physical faculties. (3) All moral disorders, especially among the poor and working classes, are due to the fact that they are left to their own guidance, and are exposed thereby to the greatest spiritual dangers. (4) Man is so prone to evil that he takes pleasure therein; this is specially noticeable among children, who, owing to their lack of proper training, cannot reflect seriously, and are consequently inclined to gratify their senses and the lower appetites. (5) Man may and can improve. (6) Men should attain the same degree of perfection, for God is the ultimate object of all. Again, men should, according to their vocation and social position, aspire to perfect the gifts or special talents with which they have been endowed. (7) To correct a defect or vice, man should make frequent acts of the virtue opposed thereto. (8) The senses, having a large share in the operations of the intellect, should be carefully cultivated. Hence the necessity of developing the intellect, of rectifying the judgment, of educating the will, and of forming the heart to virtue. (9) The teacher should imitate Providence, *i.e.* act with decision and gentleness. (10) From the intellectual viewpoint, children should gradually be trained to do spontaneously the work set for them, even when the teacher cannot be present to supervise their labor. (11) Character should be carefully molded and developed; pupils should be taught to practise virtue in a manner proportionate to their age. (12) The school should be the novitiate of Christianity, the preparation for the duties of the Christian and the civic life.

The following are the chief counsels of De la Salle concerning Physical, Intellectual, and Moral education: —

Physical. — (1) Children should be clean. Twice a day the teacher should make an examination or inspection regarding cleanliness. (2) Cleanliness of body, especially of the head, should be considered as an exterior indication of purity. (3) Children, whether standing or sitting, should at all times avoid in their deportment all affectation, restraint, thoughtlessness, or anything which would indicate effeminacy, insolence, pride, or rudeness. (4) Children should be taught habits of regularity concerning the principal actions of the day. (5) During recreation, children should prefer to engage in manly exercises which develop and strengthen the body. (6) The classroom should be thoroughly ventilated.

Intellectual. — (1) De la Salle insists that the teacher should have an accurate knowledge of psychology and of the degree of intellectual development acquired by the pupil. (2) To inspire the pupil with the love of virtue. (3) To induce the pupil to take the initiative in intellectual work, proportionate to his mental capacity. (4) To urge him to study the truth of things by teaching him the principles of logic. (5) To persuade him to study only useful subjects and dissuade him from trifling ones, or those merely prompted by curiosity. (6) The knowledge of children should be progressive as well as practical. (7) To question the pupils so as to fix their attention on the lesson given, and to ascertain that they thoroughly understand it. (8) By questioning, to teach them the truths under consideration, and to draw logical consequences from the truths with which they are familiar. (9) To employ a rational, progressive, and practical method in teaching. (10) To make use of the inductive method as one of the most efficacious means of intellectual culture. (11) To interest the parents in the progress of their children. (12) To have a daily schedule of lessons and to follow it with exactness.

Moral. — (1) To enlighten the consciences of the pupils and to guide them in their choice between good and evil. (2) To teach the pupils their duty to God, to country, to their neighbor, and to themselves. (3) To induce pupils to withdraw from everything that may corrupt their morals, especially evil companionship. (4) To cultivate the habit of frankness among pupils in word and deed, and to inspire a great horror for hypocrisy and lying. (5) To prevent faults by an enlightened vigilance. (6) To act toward the child who has contracted some vicious habit as a skillful physician treats his patient.

Qualifications of Teachers. — De la Salle demanded the following qualifications from his disciples: —

Physical: A good constitution, a strong clear, and sympathetic voice, and a dignified carriage. *Intellectual:* An understanding sufficiently keen to grasp promptly the sense of the pupil's questions, a sound judgment, practical common sense, a retentive memory, correct and fluent speech, a good method, and the facility of teaching. *Moral:* A true vocation, great dignity of character, politeness, kindness, firmness, gentleness, and an inviolable fidelity to duty, both in private and public life.

A good teacher has the virtues of gravity, silence, discretion, prudence, wisdom, patience, reserve, gentleness, zeal, vigilance, piety, and generosity.

De la Salle strongly insisted upon the correction of the following faults in young teachers: —

(1) Nervousness in teaching. (2) Petulancy and constant movements of the body. (3) Thoughtlessness and diversion. (4) Fastidiousness in punishing faults. (5) Impatience, harshness, excessive severity. (6) Spite. (7) Favoritism. (8) Slothfulness and indulgence. (9) Dullness, enervation. (10) Weakness, pusillanimity. (11) Dejection, grief. (12) Familiarity, frolicsomeness. (13) The habit of irony. (14) Inconstancy. (15) Susceptibility, jealousy. (16) Equality and uniformity of method with all the pupils, without taking into consideration the difference in age, character, and education. (17) Loss of time. (18) Presumption.

Laws of Education. — (1) Custom takes the middle course between instinct and will, which latter is a free and spontaneous activity. (2) The chief intellectual habits which the teacher should stimulate the pupils to acquire, are attention and reflection. (3) The intelligence should be exercised in the youngest pupils from the first lessons which they receive. (4) The advanced pupils should be accustomed to invent their own plans of literary composition. (5) The teacher ought to attach much importance to normal education. (6) The laws of education should be universal, expedient, progressive, and moral. Universal, *i.e.* extending to all the faculties, to all periods of life, to all classes of society, to both sexes. (7) Education should be rational. (8) Instruction is not the final object to be attained. The object is the acquisition and practice of virtue. (9) Education should be national. Moral law does not change under the varying conditions of time and place. In all countries and under the most changing climates, it preserves the same characteristics. It is peremptory, invariable, uniform, and always practical. Pupils should be brought up in accordance with the customs and spirit of the country in which they live.

Success of the Order. — The varied, yet uniform, character of De la Salle's educational methods, and the steady progress of the schools he founded in the face of the severest trials, gained for his Institute substantial aid at the hands of the civil and ecclesiastical authorities in France, so that at the outbreak of the Revolution in 1789 the Institute was flourishing and its schools bore the reputation for efficient work in the field of popular education. At that period also the simultaneous method (*q.v.*) of teaching had already been so perfectly developed that the superiority of the Christian Schools was unquestioned. Textbooks, covering all the subjects taught in the elementary and secondary grades of education, had been published in accordance with the progressive spirit of De la Salle. Brother Agathon, sixth Superior General (1777–1797), had written the *Twelve Virtues of a Good Master*, a manual of guidance for imparting the moral, intellectual, and religious instruction outlined by the founder.

History. — Scattered at the Revolution in 1791, the surviving members of the Institute resumed their work in Lyons, Paris, Rheims, and other cities, 1805. Napoleon, in 1808, gave an imperial decree reëstablishing the legal status of the institute in France. From that period is dated the constant development of the Christian Schools in respect to their external organization and the spread of the Brothers into other countries. The scheme of instruction remained the same as heretofore, *i.e.* the Christian education of youth through the teaching of the catechism and the Gospel maxims, to which were added courses of study fitting the pupils for commercial, industrial, and professional pursuits. The higher secondary program in the Christian Schools was the logical sequence of the system devised by De la Salle. Thus were developed the superior courses in the great boarding colleges of Passy (Paris), St. Étienne, Toulouse, Lyons, Bordeaux, and others which prepared students for the professional and technical courses of the Ecole Centrale and the School of Mines.

During the administration of Brother Philippe (1838–1874), the Institute made great progress. In 1838 the Brothers opened a free grammar school in Montreal, Canada. Some years later, 1846, schools were established in Baltimore and New York City. When Brother Facile became the Visitor of North America, in 1848, there were 56 Brothers, 3200 pupils, representing the strength of the Institute in Canada and the United States. In 1873, at the close of Brother Facile's active life, there were 5 districts, 176 houses, and 900 Brothers, having charge of 36,500 pupils in colleges, academies, high schools, grammar schools, asylums, and protectorates.

The census of the Institute in 1907 gives Canada 692 Brothers, 40 in the normal institutes, and 36 novices. The establishments under the management of the Brothers number 51, comprising day and boarding colleges, academies, grammar schools, and asylums, with an enrollment of over 20,000 pupils. Mt. St. Louis College, Montreal, is the most important institution, opened in 1887, having on its roster 300 boarders and 310 day pupils.

New York district was and still is the scene and center of the greatest activity of the Christian Brothers in the United States. Brother Ambrose was the moving spirit of the remarkable development of Catholic educational work in the '50's. In 1863, under the management of Brother Patrick, Manhattan College began its successful career, and its graduates are found in all professions. Academies, grammar schools, and orphanages had also been founded in Troy, Albany, Utica, Buffalo, and Detroit. Thus, in the short space of 15 years, the Brothers developed in New York a complete system of higher secondary education: the elementary, grammar schools, academies and high schools, and the college. To this was added in 1863 the New York Catholic Protectory, having over 2000 inmates, who apply themselves to the various trades. This institution has become the model for similar ones throughout the states. The value of this complete system of education, devoted to the conservation of Catholic life, and to the development of higher culture, under an organized body of educators, is suggestive. The New York District was established in 1861, with Brother Turibe as Visitor. Brothers Ambrose, Patrick, Paulian, Justin, Joseph, and Gerardus have successively held that position. The district now includes the institutions of the Brothers in the archdioceses of Boston and New York, and in the dioceses of Albany, Brooklyn, Buffalo, Cleveland, Detroit, Manchester, Portland, Providence, Fall River, Hartford, Springfield, and Syracuse, numbering 39 houses. The Christian Schools in the archdiocese of Halifax are likewise affiliated to those of the New York district. The normal institute is located at Poncantico Hills, N.Y.

In 1849, Brother Philippe, tenth Superior General (1838–1874), sent three Brothers to St. Louis, to open a free grammar school at the earnest solicitation of Archbishop Kenrick. In 1851 the Christian Brothers College was opened, having a well-organized plan of instruction and with full power to confer degrees usually granted by universities of learning. The progressive methods adopted by the faculty of the college drew many students to its halls from far and near. To meet this increase of patronage, Brother James, president, sought a better site and built a more commodious institution. The new college was built in 1882, at Côte Brillante, within the limits of the city. Brother Justin, its present head (from 1903), has added an engineering department to satisfy the demands of the students who desire to become skilled mechanical, electrical, or civil engineers. Its enrollment is over 500, and its courses have the sanction of the New York Board of Regents. St. Louis was formed into a district in 1870, with Brother Edward as Visitor. His successors were Brothers Romuald, Paulian, and the present incumbent, Brother Emery. The district includes schools in the archdioceses of St. Louis, Chicago, St. Paul, and Santa Fé, as well as in the dioceses of Kansas City, St. Joseph, Nashville, and Duluth. The Christian Brothers College graduates are prominent in the professions, in civic and political life, and may be found throughout the South and West. The Normal Institute is at Glencoe, Mo.

The District of San Francisco was established in 1868. This arduous task fell to the lot of Brother Justin, who with seven Brothers assumed the charge of St. Mary's College, September, 1868. The indomitable courage and energy of Brother Justin was instrumental in multiplying the houses of the district. Many of the graduates of St. Mary's College became members of the Institute, thus providing professors of ability who helped to develop the educational ideas of De la Salle, applying them to the requirements of the peculiar conditions prevailing on the Pacific coast. The college prospered, and the Brothers were obliged to erect another college to accommodate the eager students that demanded admission. In 1889 St. Mary's College was removed to Oakland. Its well-equipped engineering course was created by Brother Bernard in 1903. The successors of Brother Justin as Visitor are Brothers Bettelin, Theodorus, and Xenophon. This district has grammar schools, academies and high schools, commercial schools, and colleges. Besides several houses in San Francisco, the Brothers are established in Berkeley, Portland, Sacramento City, Santa Cruz, St. Vincent, Walla Walla, and Vancouver. The members number over 150. The normal institute is at Martinez.

The Baltimore District, which was founded, October, 1879, has colleges in Ellicott City (Rock Hill College), Md., in Philadelphia, Scranton, Baltimore, and Washington. These colleges are conducted on the same lines as those in the other districts. It has 3 industrial Protectorates, viz.; at Pawling, Pa., Eddington, Pa., and Belmead, Va. Besides these institutions, the Brothers have the management of large grammar schools in Augusta, Ga., Cumberland, Md., Germantown, Jersey City, Newark, Orange, Patterson, Richmond, Va., 6 in Philadelphia, numbering in all 24 houses. Brothers Christian, Romuald, Quintinian, Reticius, and Austin have had the administration of the district. The normal institute is at Ammendale, Md.

The Christian Brothers in the United States have 96 schools, consisting of normal institutes, colleges, high schools, academies, grammar schools, orphanages, and industrial protectorates. These are distributed in 31 archdioceses and dioceses, with a total enrollment of over 57,000 pupils; 265 young men are under instruction in the normal institutes and novitiates, as candidates for membership in the Institute. The personnel of the congregation includes natives of 46 different countries.

Literary and Scientific Works. — The Institute, in the United States as elsewhere, has its own series of textbooks, composed by the Brothers and published in its name. These embrace classbooks for teaching reading, writing, arithmetic, algebra, geography, history, grammar, rhetoric, literature, drawing, Christian doctrine, pedagogy, and methodology. The following works may be pointed out: —

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B. C.

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CHRISTIAN BROTHERS' COLLEGE, MEMPHIS, TENNESSEE. — See Christian Brothers, Schools of.

CHRISTIAN BROTHERS' COLLEGE, ST. LOUIS, MO. — See Christian Brothers, Schools of.

CHRISTIAN COLLEGE, COLUMBIA, MO. — An institution for the education of young women, established in 1851. College preparatory, collegiate, and fine arts departments are maintained. Entrance requirements are indefinite. Degrees are conferred. There is a faculty of 20 instructors.

CHRISTIAN EDUCATION IN THE EARLY CHURCH. — Although it has been rightly said that the Christian Church is the mother of schools, yet it is only of the Church of the Middle Ages and of the West that this is true. In the first centuries of its existence the Church appears to have done little for the education of its members by the way of schools. This, however, was not strange. In the first place, the Church regarded itself as an educational institution. It was itself engaged in teaching, not mere speculative dogmas, but the practical wisdom of life, and this was what many of the philosophical schools were doing. Among the Church's officers were teachers, *didaskaloi*, those who had the *charisma* of teaching (cf. Eph. 4 : 11). The Christian community in some places assumed for protection the form of a philosophical school without making any change in its nature, customs, or constitution. In the second place, faith in the speedy return of Christ in glory continued to be a determining factor in life until well into the second century. Few institutions, therefore, were as yet rigidly established. Only as conflicts with heresy and serious problems of administration arose did ecclesiastical institutions take form and assume prominence in the Church's consciousness. Toward the end of the second century chiliastic expectations became less general, and were confined more and more to minor sects and parties, and the Church began to make itself at home in the world. Even then the Church did not make any provision for secular education, although the only schools available were those kept by heathen teachers who used heathen textbooks. There were, therefore, no schools of elementary instruction officially connected with the Church for centuries, with the exception of the monastery schools under the rule of St. Basil (*q.v.*), and other monasteries of the East. In the West only with the Benedictine rule, after 500, do they become at all common, and then only in monasteries. Neither is there any satisfactory evidence that Christians in any number adopted the profession of teacher for the sake of Christian children. A number of difficulties stood in the way of a Christian who would adopt the profession. The subjects taught in the elementary schools were of necessity connected with pagan literature, for there was as yet no Christian literature worthy of the name. Then again, the life of the teacher necessarily brought him in contact with heathen worship, and, if he would open a school, he was obliged to follow heathen customs. These disadvantages Tertullian (*q.v.*) sets forth with his usual vehemence in his work *On Idolatry* (cf. especially ch. 10). Nevertheless, some did venture upon a profession regarded by many as dangerous to the Christian's faith. Thus Origen (*q.v.*), when he was left penniless by the confiscation of the property of his father, the martyr Leonidas, supported himself and his mother by teaching rhetoric, and it is probable that the School of Alexandria (*q.v.*), which had been broken up by the persecution of Septimius Severus in 202, thus opened again under the guise of a rhetorical school, with Origen as its teacher. (Cf. Neumann, *Der römische Staat und die allgemeine Kirche*, I, 164.) But the other cases of rhetorical teaching by Christians are very scanty and doubtful before the end of the third century. Malchio is mentioned by Eusebius (*H. E.* VII, 29, 2) as principal of the Greek school at Antioch (*q.v.*), who, nevertheless, was a presbyter of the Church of that city, having been made such on account of his superior faith in Christ. It may be that on becoming a Christian he abandoned teaching rhetoric as a profession, as was the case with Cyprian (*q.v.*) on his conversion, who had formerly been a distinguished teacher of rhetoric. But we certainly find Christian teachers of rhetoric by the middle of the fourth century, and they were probably numerous by the time of Julian's edict against Christian teachers in 362. During the heathen Empire and for a considerable time after the sole reign of Constantine, Christians were obliged either to have tutors for their children at home or to send them to the heathen teachers, in both cases using heathen literature as the means of instruction, or they had to teach them themselves as best they could. It was practically impossible for Christians wholly to refrain from attendance on the schools. Even such a rigorist as Tertullian had to admit the necessity of secular education in spite of the objectionable literature; though in the case of the student there was less danger to the faith than in case of the teacher, *i.e.* danger of being involved in acts that might be regarded as forms of idolatry.

In the matter of higher instruction the case was somewhat different from that of elementary literary instruction. Even the rhetorical schools taught more than belles-lettres; historical and scientific works were read. The texts of the latter were less defaced with mythological matter and salacious morality, and might safely be employed by Christians both as teacher and as students. Such were the works of Aristotle, Euclid, and Galen, studied in the Christian schools conducted by Theodotus at Rome. (Cf. article on CATECHETICAL SCHOOLS.) The teacher of philosophy, furthermore, might easily treat Christianity as the supreme philosophy, and pursue methods similar to those followed in other philosophical schools. This was all the more easy because Hellenistic philosophy had entered upon its religious stage and was studied very largely from religious interest. As a fact, a number of men of philosophical training became Christians; some were professional teachers of philosophy, of whom the most important were Aristides, Justin Martyr, Athenagoras, Pantænus (*q.v.*), Clement of Alexandria (*q.v.*), and probably Melito of Sardis. Of these Justin Martyr, Pantænus, and Clement are known to have become professional teachers of Christian philosophy, the former conducting a school on his own responsibility, the two latter being connected with the Catechetical School of Alexandria. (See article on CATECHETICAL SCHOOLS.) The case of Justin Martyr is no doubt typical of others of less distinction. He treated Christianity as a philosophy, and continued to wear his philosopher's cloak, and saw nothing to prevent his practice of his profession as a teacher of philosophy. He was now an adherent of the school of Christ, and not of the heathen philosophers. The theoretical justification was simple; what the divine *Logos* had revealed in part to Socrates had been completely revealed in Christ, who was the incarnation of that same *Logos*, or divine reason. (Cf. Justin Martyr, II, *Apol.*, c. 10.) The same line of thought was taken up by Clement (*q.v.*), who regarded the Law of the Jews and the Philosophy of the Greeks as being both divinely ordained forms of preparation for Christ. But the amount of private teaching after the method of Justin Martyr could never have been considerable. It does not seem to have affected the life of the Church as a whole; it gave rise to no institutions, and left no trace upon legislation. The men who gave themselves to it were never numerous at the most, and in the course of the Church's development they would have less and less opportunity for treating Christianity in this way. The chief schools of this sort appear to have been those of the Gnostics (*q.v.*), and men who by eccentricity of doctrine separated themselves from the main body of the Church, so that the name "school" became early synonymous with schism and heresy. (Cf. Harnack, *Mission und Ausbreitung des Christentums*, 1906, Vol. I, pp. 300 f.) Those who did not alienate themselves from the main body of the Church could carry on their work as private teachers only before the rise in the Church of a body of Christian theology, *i.e.* before the early part of the third century. After that time they would have been strongly suspected of heresy. From the early part of the third century, in spite of the attitude of Clement of Alexandria, Christian thought was regarded in most parts of the Church as something different from, and superior to, philosophy. The Gnostics were too much concerned with philosophical problems to make the study of philosophy or the treatment of Christianity as philosophy appear as anything other than something extremely doubtful if not positively heretical. (Cf. Tertullian, *De Praescriptione*, c. 7.) Men who had been trained in philosophy now found work in other occupations than that of a private teacher; the charismatic didaskaloi had long since given way to ordained clergy as teachers. But men of philosophical training could still find abundant opportunity for their dialectical powers in the explication and defense of doctrine. The Church was building up a body of science which was itself a subject of profoundest study and a means of education. If these men became clergy, as not a few did, they would employ all their talents in the work of preaching, which in the East, at least, became a universal means of popular education in religion and ethics. Speculative philosophy and metaphysics under such circumstances would be entirely beside the mark. And as a matter of fact, no Christian takes any prominent place as a philosopher, though not a few were thoroughly conversant with the prevailing schools and employed the current conceptions in their theological science.

What the Church was able to do directly and confessedly for education in the first centuries was not in the form of literary instruction, but in what was more in harmony with its mission, in the catechumenal instruction. (See Catechumenal Schools.) And it regarded it as its duty to impress upon the minds of parents the necessity of the moral instruction and training of their children and the obligation of parents to see that their children were taught religion and morals. In the matter of catechumenal instruction the training and discipline in morality and the actual instruction in the doctrines of the faith were given to candidates for baptism, as yet chiefly adults. In the matter of parental training, the exhortations of the Apostolic Constitutions, which never received any general authority and which date for the most part from the fourth century, may be taken as typical of Church teaching generally. They did little more than enlarge upon the precepts of the New Testament. The catechetical schools, however, did take up the advanced instruction of students beyond the primary stages of discipline, and in some cases, notably that of Alexandria and Cæsarea under Origen, covered the whole range of religious and secular education. (Cf. Gregory Thaumaturgus, *Panegyric on Origen.*) But it is hardly likely that this comprehensive treatment of all branches of knowledge was followed in other catechetical schools, and it is probable that it was peculiar to Origen.

After the establishment of Christianity as the religion of the State, nothing stood in the way of the foundation of Christian schools. Yet young Christians still patronized heathen schools. The profession of teacher, except in the case of religious instruction, does not seem to have been followed by many Christians for some time after the downfall of heathenism. Proæresius, one of the Athenian professors of Gregory of Nazianzus and the emperor Julian, was a Christian teacher of distinction, as was also Basil, the father of Basil the Great of Cæsarea. The best evidence that it remained the custom for Christian parents to send their children to heathen teachers, at least after the first rudimentary instruction, is that eminent Christians, brought up by Christian parents renowned for their piety, were so sent. This was the case of Gregory of Nazianzus (*q.v.*), the son of the Bishop Gregory of Nazianzus. After he had studied at the Catechetical School of Cæsarea, and possibly for a short time at Alexandria, he went to Athens, where he attended the lectures of heathen as well as Christian teachers. The same is true of Basil of Cæsarea, Gregory's intimate friend. His father, though a Christian, and an advocate and teacher of rhetoric, sent him to Athens after giving him some instruction himself. John Chrysostom (*q.v.*) received the bulk of his higher instruction from the heathen sophist Libanius. Jerome (*q.v.*), born of Christian parents and educated strictly and religiously, after studying with Donatus, the grammarian (*q.v.*), studied with the philosopher Victorinus while he was still a heathen. The list could be enlarged. The case of Augustine (*q.v.*) is hardly to the point, as Monica's religious career began after her son was a grown man, and she was little more than a nominal Christian during his youth.

After the middle of the fourth century, things changed, and more Christians became teachers of rhetoric and possibly of philosophy. This change was natural enough, in spite of the fact that the classical literature was still studied in instruction in rhetoric. The Church had begun to make terms with the world and to tolerate what was once an abomination to stricter Christians. That the Christian teachers must have been numerous is clear enough from Julian's attack upon them, already alluded to, whereby in 362 they were forbidden to use the classical literature and were directed to confine themselves to the Gospels. In this edict Julian attempted both to discredit the Christian teachers and to bring Christians distinctly under heathen teachers. The attempt of some Christian teachers to prepare substitutes for the classics was not fated to be carried to its natural termination, as Julian's edict was repealed in 364. At Athens and probably elsewhere, Christian teachers resumed their accustomed textbooks and taught side by side with heathen instructors. In the Western Empire Ausonius, a Christian, acting under the commission of Gratian, reorganized the system of imperial schools and restored the former methods and textbooks. Late in the fifth century the heathen schools of Athens were flourishing, and the Neo-Platonic philosophy entered upon its most developed state under Proclus (d. 485). The study of Aristotle was revived by heathen teachers both at Athens and Alexandria, and influenced in no small degree the later developments of patristic theology. The end of confessedly heathen schools seems only to have come with the closing of the schools of Athens in 529 by Justinian in his plan to strengthen and reorganize the schools at Constantinople. (See ATHENS, UNIVERSITY OF.)

In the matter of heathen classical literature used in instruction, it should be frankly recognized that there was a distinction made between the purely literary productions and the scientific and historical works. There was reason in the Christian's scruple as to the use of the former when the real existence of heathen gods was accepted by all parties in the Church. There was also the practical question of perversion to heathenism, at least until after the time of Julian. Under such circumstances it may be asked whether it was morally justifiable for Christians to send their children to study works that were filled at once with false beliefs and polluting indecencies. Much as it looked like obscurantism on the part of men like Tertullian when in perfervid rhetoric they denounced classical literature and its teachers, it was at the bottom merely reasonable consistency. The classical works of Horace and other poets had not been edited *in usum Delphini,* and they presented then, as now, a morality and a teaching often utterly contrary to Christian sentiment. It was to this phase as much as to the mythology that objection was taken. True it is that Tertullian also denounces philosophy because of its connection with Gnosticism, yet he himself is saturated with Stoic metaphysics, and is willing enough to profit by the best science of his times in his treatise *On the Soul.* (For the use made by Tertullian and others of Greek medical science see Harnack, *Medizinisches aus der ältesten Kirchengeschichte; Texte und Untersuchungen,* Bd. VIII, 1892.) The extreme position is not typical of the Church in the first centuries. The Apologists constantly appealed to heathen writers; so did Clement. Origen recognized the consequences of the fact that the Apostle Paul made citations from heathen writers. So far as there was prohibition of heathen books, it was a part of a system which aimed to prohibit heretical and bad books which came into existence in the reign of Constantine. (Cf. Eusebius, *Vita Const.,* III, 66.) Basil distinctly defends the use of classical literature in his so-called homily *Ad Juvenes.* But toward the end of the fourth century the monastic and ascetic spirit began to oppose this literature. Thus Jerome says he gave up reading such after 374. His example had great weight, and it is with him that the sentiment began to turn against the use of the classics. (Cf. Jerome, *Ep.* 20, *ad Eustorch.,* § 30.) Yet he recognizes the necessity of such books, and defends their use by Christian theologians (Ep. 70, *ad Magnum*). He actually taught Vergil and other profane writers in the school he established in his monastery at Bethlehem! Augustine, although perceiving the danger in the study of the classics, recognized their utility as a whole for the Christian teacher. (*De doctrina Christiana,* II, 40.) In spite of the obscurantism of Gregory the Great, due in great part to his belief in the approaching end of the world, and in spite of his enormous influence upon the Middle Ages, in spite of monkish asceticism which tried to prevent the reading of profane writers, their works, which had formed the basis of early education under the Christian Church, remained in use and were read constantly in the monasteries and other centers of learning, until the overwhelming interest in scholastic theology absorbed the mind of the learned, and little attention was given to literary elegance. J. C. A., JR.

See CHURCH SCHOOLS; also BISHOPS' SCHOOLS; CATHEDRAL SCHOOLS; CLOISTER SCHOOLS; COLLEGIATE CHURCH SCHOOLS; MONASTIC SCHOOLS; etc.

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CHRISTIAN UNIVERSITY, CANTON, MO. — Founded in 1852 under the auspices of the Christian Disciples Church. It is a coeducational institution, with academic, collegiate, theological, and musical courses. About 14 units are required for admission, which may be by examination or certificate from recognized high schools and academies. Degrees are conferred in the college and theological courses. There is a faculty of 11 professors and 3 instructors.

CHRISTIANIA, UNIVERSITY OF. — The only university in Norway, founded in 1811 and opened for instruction in 1813. Faculties of law, medicine, arts, sciences, and theology are maintained. In 1909 there were about 500 students in attendance. See NORWAY, EDUCATION IN.

CHRODEGANG. — A Benedictine monk, born about 712, died in 766, who held the office of chancellor under Charles Martel, and that of Archbishop of Metz from 742 to 766, and attempted to effect a literary revival in the monasteries of northern Germany. His system of rules was very generally adopted throughout western Europe; and the result was a certain standardization of monastic singing, language, and script, which continued to be effective until the time of the greater revival under Charles the Great.

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CHROMATIC QUALITIES. — By these are meant chromatic as distinguished from achromatic (*q.v.*); the term "chromatic," then, applies to all visual sensations that are neither white, gray, nor black. The purest of chromatic qualities are obtained by analyzing white light, either of the sun's rays or of some artificial source, by passing it through a prism, into its constituent color elements. Such a prismatic band of colors is termed a spectrum, and may be roughly divided into four parts — the colors from red to yellow, from yellow to green, green to blue, and blue to violet. The transition between the members of any such pair is through a series of qualities bearing some resemblance to each color of the pair, but the colors mentioned first in each pair — red, yellow, green, blue — are turning points in the series, since no one of them resembles the other three. These are often called the primary or cardinal colors, and play an important rôle in color investigation and theory. Most colors in everyday life are not, indeed, pure colors (see COLOR), and for some of them (the purples) there are no like colors in the spectrum. By mixing (see COLOR MIXING) two colors near the respective ends of the spectrum, however (for instance, red and blue), a series of purples may be obtained. The chromatic spectral qualities might thus be ordered in a color circle (*q.v.*) — red, yellow, green, blue, violet, and through the purple back to red. We can discriminate about 150 different chromatic qualities in the spectrum, and many thousands of tints (*q.v.*), hues (*q.v.*), and shades of these. A chromatic quality may be adequately defined by giving its tone (*q.v.*) or hue, its brightness or intensity (*q.v.*), and its saturation (*q.v.*).

R. P. A.

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CHRONOGRAPH. — An apparatus for recording, usually on a smoked surface, time intervals. The apparatus is used in various types of reaction experiments (*q.v.*). See also KYMOGRAPH.

CHRONOLOGY. — See HISTORY.

CHRONOSCOPE. — An apparatus for measuring very short intervals of time, from $\frac{1}{100}$ to $\frac{1}{1000}$ second. This is used in determining the length of reactions. See REACTION EXPERIMENTS.

CHRYSOLORAS, MANUEL. — Diplomat and scholar of the Byzantine Empire, who exercised considerable influence among the early Humanists in the revived study of Greek. He was frequently sent to the West on diplomatic missions, and in 1396 he was invited to remain at Florence to teach Greek. His stay lasted from 1397 to 1400, when he removed for 3 more years to Pavia. He also taught at Venice. Among his pupils were Guarino (*q.v.*), who lived in his house at Constantinople as a *famulus* and was also taught by his son, and Vergerius (*q.v.*). Filelfo (*q.v.*) married his niece. Chrysoloras was the author of a Greek grammar in Greek in the form of question and answer (*Erotemata*), which was edited, with a Latin version, by Guarino. The son of Chrysoloras, Johannes, was a teacher in Constantinople.

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CHRYSOSTOM, JOHN. — The greatest pedagogue of his day, and probably the greatest preacher of all time, was born at Antioch, A.D. 347, and died in exile, 407. Descended from an illustrious family, he enjoyed the highest educational advantages. His mother, Anthusa, a woman of rare Christian graces, devoted herself wholly to his education. He studied under the best masters — the celebrated rhetorician Libanius, the philosopher Andragathius, the theologians Meletius, Theodorus, and Diodorus of Tarsus. Revolting from the sordid life of the forum, he became a Christian and spent six years of solitary study with a company of hermits. Returning to Antioch, he was ordained to the ministry, and soon won world-wide fame as a preacher and teacher. Antioch was then the intellectual center of the world, and Chrysostom became the dictator of its thought. The Catechetical School of Antioch (*q.v.*) was then even more flourishing than that of Alexandria (*q.v.*), but followed Aristotle rather than Plato and was less given to the study of Greek philosophy and more to the exposition of Holy Scripture and Christian doctrine. Its great teachers inaugurated the literal and historical method of exegesis instead of the allegorical interpretations of Origen (*q.v.*). It matured many of the greatest theologians of the Greek Church, but its finest product and its head during its most flourishing period was St. Chrysostom. All fourth-century educational progress centers round his name. The Church was then the mother of schools, and the world is indebted to her for the survival of learning. This alliance between the Church and the school imparted to educational work a spirit of intense earnestness and seriousness which it had not possessed before. St. Chrysostom regarded education as the chief handmaid of the Church, and established schools and directed educational movements throughout the Eastern Empire. Among his pupils was John Cassian (*q.v.*), who inaugurated the educational influences which later on enlightened the whole Western Church. Like the Alexandrian Fathers, St. Chrysostom held that the Christian scholar should extract the honey from the flowers of heathen poetry and philosophy, and consecrate it to the service of the Church, but he violently opposed the theater as injurious to public morality. Some of the pedagogical principles which he laid down may be summarized as follows: Women, especially mothers, are the natural educators of children; Christian life and experience are the foundation of all true education, and therefore all parents and teachers must teach not only by precept but by example; religious education is an essential factor in school work, and hence it is of the highest importance that children be brought up "in the nurture and admonition of the Lord"; as Christ lowered himself to man's estate in order to raise men to a higher level, so the teacher must lower himself to the capacity of his pupils in order to elevate them to his standard; just as Christ left his pupils to discover much of the truth for themselves, so the teacher must not do for his pupils what they can do for themselves. During the twelve years of his ministry in Antioch, John attained the perfection of sacred eloquence, won from an admiring posterity the surname Chrysostom (the Golden-mouthed), and became a great moral and intellectual force which was felt throughout the world. In 398 he was forced to become Patriarch of Constantinople, and filled this difficult and responsible post as Head of the Greek Church until his martyrdom. He devoted much attention to Liturgics, and framed the Liturgy which bears his name and is still used throughout the Oriental Church. His extant writings exceed in bulk those of any Greek Father, and contain a vast variety of valuable material. They include 240 letters (many of them of extreme interest), more than 1000 sermons (in which a wealth of sacred and secular learning is brought to bear upon the exposition of divine truth), and a most valuable commentary covering nearly the whole New Testament. His *Golden Book concerning the Education of Children,* which lays down the moral and religious basis of education as conceived in the Early Christian period, has been well translated by John Evelyn (*q.v.*). W. R.

See CATECHETICAL SCHOOLS; CATECHUMENAL INSTRUCTION; CHRISTIAN EDUCATION IN THE EARLY CHURCH.

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